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ABSTRACT

This excursion guide describes the Zuyder Zee project which dammed and partially drained a low coastal area of the northern Netherlands. The guide also provides itineraries and other practical information for visitors to the area. It is one of a series of publications developed by the Information and Documentation Center for the Geography of the Netherlands (IDG), a nonprofit organization whose aim is to supply information and documentation about the geography of the Netherlands to institutions and bodies outside the country. There are three sections. Section one contains a history of the area and provides a summary of the Zuyder Zee project describing its origin and execution. The significance of the reclamation activities for the Netherlands is discussed. The second section of the guide presents and describes excursion routes. The appendices, which comprise the third section of the guide, describe archaeological finds in the area, present demographic statistics, explain topographical names, discuss modes of transportation and accommodations, and list recommended readings and maps. (RM)

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lake ijssel

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ZUYDER ZEE / LAKE IJSSEL

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COVER The south-eastern portion of the Wieringermeer Polder and the Lely pumping station; at the bottom, a diagrammatic cross-section of polder/dike + pumping station/Lake IJssel.

FOREWORD

On the advice of the Council of Europe, an Information and Documentation Centre for the Geography of the Netherlands (IDG) was established in the Netherlands in 1964 through the collaboration of the university institutes of geography and the Royal Netherlands Geographical Society (KNAG), under the auspices of the Ministries of Education and Sciences and of Foreign Affairs.

During the past few years the Centre has dealt with thousands of requests for information, documentation and assistance in planning excursions. The project for the damming and partial draining of the Zuyder Zee has been prominent among the themes which regularly recur and this has led the Centre to compile a concise geographical excursion guide, which contains, besides a summary of the Zuyder Zee project and its background (section A), itineraries and other practical information for visitors to the area (section B).

In comparison with the second edition of 1975, this current third edition of the guide has been altered and adapted in many respects to take account of the latest developments. The changes relate particularly to the reclamation of the South Flevoland polder and the plans for impoldering the Markerwaard. The completion of the dike and the road between Enkhuizen and Lelystad has opened up new possibilities for excursion routes.

The guide does not claim to be exhaustive. Infinitely more could be said about the Zuyder Zee plan and the planning of the new polders. It is intended only as a companion for a visit to the area and an encouragement to the visitor to increase his knowledge and deepen his understanding through observation of the area and study of the literature.

Section 5 of the Appendix contains a list of some of the literature about the Zuyder Zee region.

For information about developments which have taken place after the appearance of this guide the reader is referred to the annual IDG-bulletins.

The guide, which is published in German, English, French and Dutch language versions, is obtainable from Dutch embassies and consulates as well as from the IDG.

The IDG will be happy to give further assistance (address: Heidelberglaan 2, Utrecht) and to receive your comments and suggestions concerning this guide.

Utrecht/The Hague, 1981

Drs. H. Meijer,
Manager of the Bureau of the
Information and Documentation Centre.

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Maps, diagrams etc.

fig. 1, 14, 17	– from "A Compact Geography of the Netherlands", 3rd ed., 1979, pub. I.D.G./Ministry of Foreign Affairs
fig. 6-11, 12, 13, 15, 21, 24, 26, 32	– Dienst der Zuiderzeewerken
fig. 16, 19, 22, 25, 27, 28, 29, 30, 32, 33, 34	– from various publications of the Lake IJssel Polders Authority
fig. 23	– Geographische Rundschau, 1970-4
fig. 38	– Topographical Service, Delft
cartography	– Th. Woudstra, Institute of Geography, State University of Utrecht

photographs

I, III, IV, VI, IX, XiX, XXV, XXVI	– KLM-Aerocarto, The Hague
cover, V, X, XII, XIII, XIV, XV, XVI, XVIII, IXX, XXII, XXIV, XXVII, XXVIII	– Bart Hofmeester, Rotterdam
VII	– Rijksdienst voor de IJsselmeerpolders, Lelystad
VIII	– Aerophoto Eelde
XI	– Doeser Fotos, Laren
XVI, XVII, XX	– Aerophoto, Schiphol
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A – GENERAL SECTION

Chapter 1 – Origin of the Zuyder Zee

From Lake Flevo to Lake IJssel

The struggle between land and water, as it is enacted along many coasts, presents a very diverse picture in the region of the Zuyder Zee. Sometimes the land won and the sea was driven back, but often the sea struck back, washing away much of the land that it had itself helped to form. Because of this varying struggle it is difficult to gain an accurate picture of the genesis of the Zuyder Zee. The accompanying maps (fig. 2-5) nevertheless attempt to do this, although it must be admitted that many variants are possible, particularly of the first map. The reason for this is not only the obscurity of history, but also the fact that, formerly in these coastal regions, as the Roman author Pliny put it "in this eternal struggle in the course of nature it was doubtful whether the ground belonged to the land or the sea ....." (photo I).

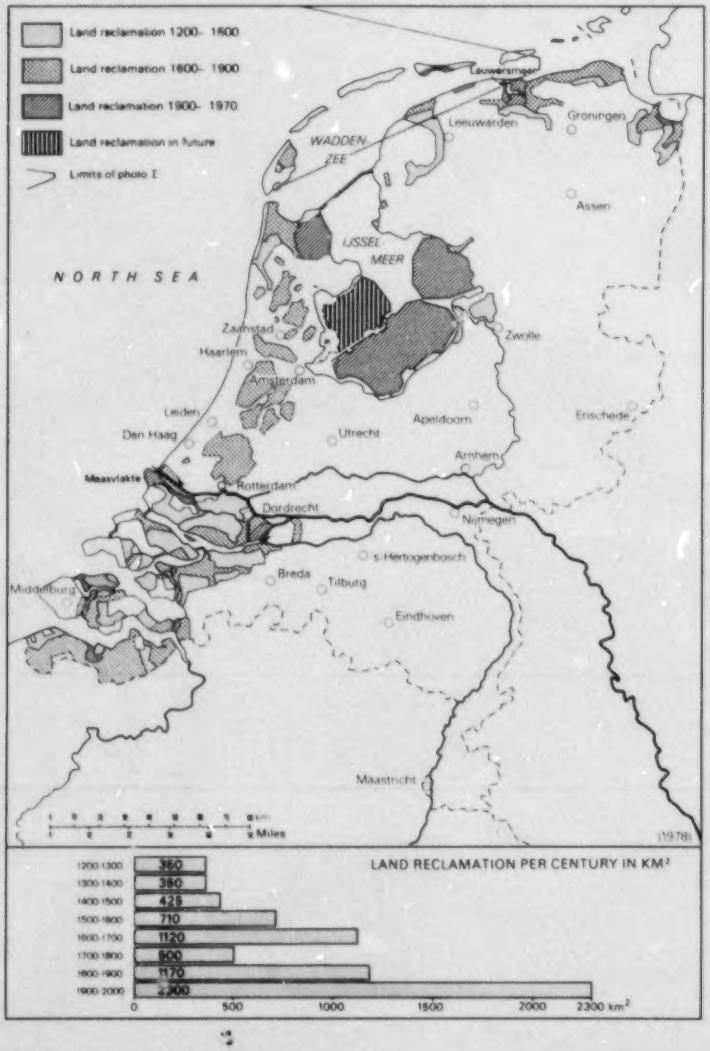


Fig. 1 – Land gains since 1200.

photograph 1 – *"..... in this eternal struggle in the process of nature there is doubt whether the ground belongs to the earth or to the sea".* *Pliny the Elder, 47 A.D.*

Part of the Wadden Sea, looking west, with the coast of Friesland left; right, from foreground to background, the islands of Ameland, Terschelling and Vlieland (see also fig. 1).

Nevertheless, on the basis of soil investigations, the following development may be accepted as the correct one in broad outline:

Fig. 2 – After the initial creation of a marine inlet from the west, there existed during the Roman period, in the middle of what later became the Zuyder Zee, a lake known as Lake Flevo, that had a narrow connection on the north with the North Sea (on figures 2 and 3 dotted lines indicate the situation at the beginning of the 20th century).

The later *Wadden Sea* and the northern part of the later Zuyder Zee then consisted largely of marshy peatlands. There was also land in the southern part of the later Zuyder Zee. Archaelogical finds demonstrate that there was already human occupancy here for thousands of years before the beginning of the current era (see Appendix 1, p. 65).

During the Middle Ages Lake Flevo increased considerably in size and consequently came to be called Almere (= big lake). The reasons for this loss of land include the erosion of the soft, peaty shoreline and the rise in sea level as a result of the melting of the ice caps after the last Ice Age.

Fig. 3 – As the *transgression* progressed during the 11th, 12th and 13th centuries various floods occurred, resulting in the creation of the Zuyder Zee, which had open connections with the North Sea through wide gaps in the dune chain of the Frisian Islands.

Fig. 4 – From the 13th down to the end of the 19th century many pools and lakes were drained in the coastal areas, particularly on the west side of the Zuyder Zee (see fig. 1), resulting in the situation illustrated here preceding the *Zuyder Zee works* around the beginning of the 20th century.

Fig. 5 – This is the situation as it exists at the moment. Comparison with fig. 2 leads to the conclusion that the Zuyder Zee project will not, in fact, result in a real *gain* of land, but rather that much of the land which was lost during the course of history is now being won back.

fig. 2 – Roman period

fig. 3 – late Middle Ages

fig. 4 ± 1900

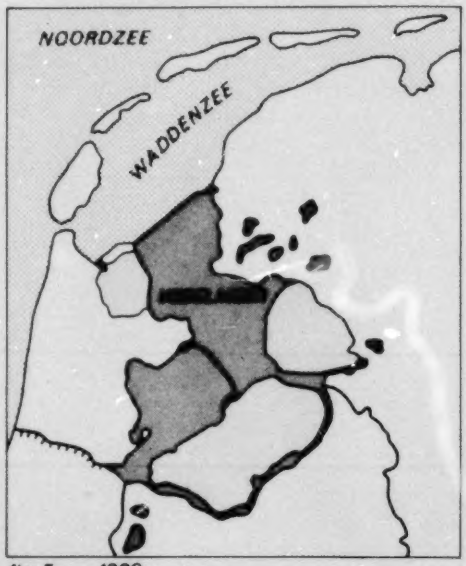
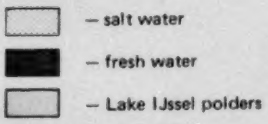


fig. 5 1980



figs. 2 - 5 – Evolution of the Zuyder Zee region.

As early as the Middle Ages the inhabitants of the Low Countries here and there seized the opportunity to pass from defence to attack in the battle against the water and to capture or recapture the land.

Later, many pools and lakes, often created by the digging away of the peat layers, were turned back into land using the impoldering technique. This involved the building of a dike and, where necessary, a ring canal around the area to be reclaimed, after which windmills were used to pump out the water and subsequently ensure that the groundwater table was kept well below the land surface.

During the 19th century a new pumping technique was introduced with the use of steam, which inspired the Dutch to even bolder plans. For example, the great Haarlem Lake (Haarlemmermeer) between Amsterdam and Leiden was vanquished in 1852 and the lowest polder in the Netherlands, the Prins Alexander Polder north east of Rotterdam, was created in 1874. This polder lies at 6.60 m. below N.A.P. *) and now contains a large dormitory town where only the third floors and above of the blocks of flats are above sea level!.

It is hardly surprising that thoughts also then turned to the Zuyder Zee, although it was incidentally not the first time. As early as 1667 Hendrik Stevin devised a plan for building dams with locks across the sea passages between the Frisian Islands, draining large areas of the Wadden Sea and Zuyder Zee and creating a new shipping route between Amsterdam and the North Sea, approximately on the line of the later *North Sea Canal*.

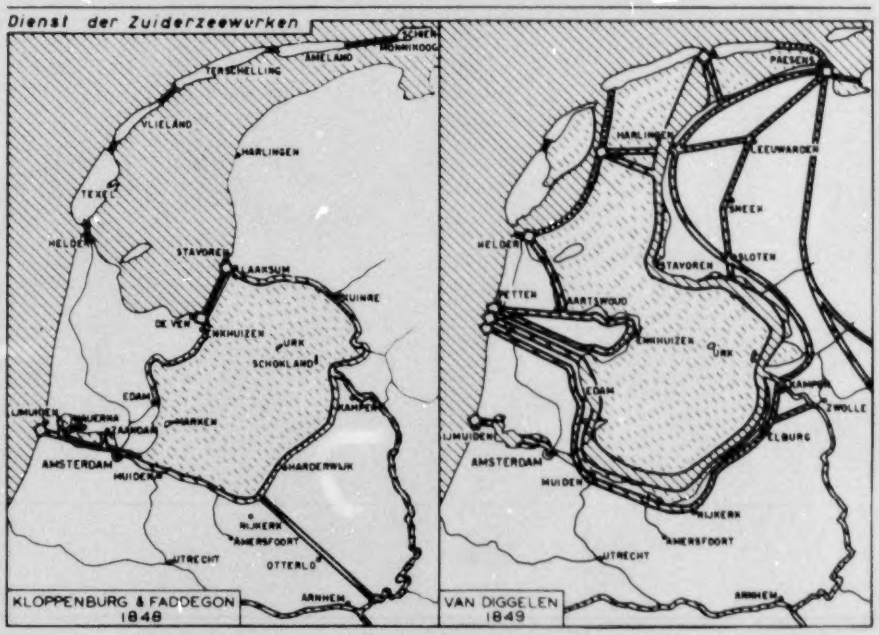


fig. 6 fig. 7

figs. 6 - 11 – Some of the plans for damming off and/or draining all or part of the Zuyder Zee.

*) N.A.P.: Normaal Amsterdams Peil (Normal Amsterdam Datum) = average marine water level.

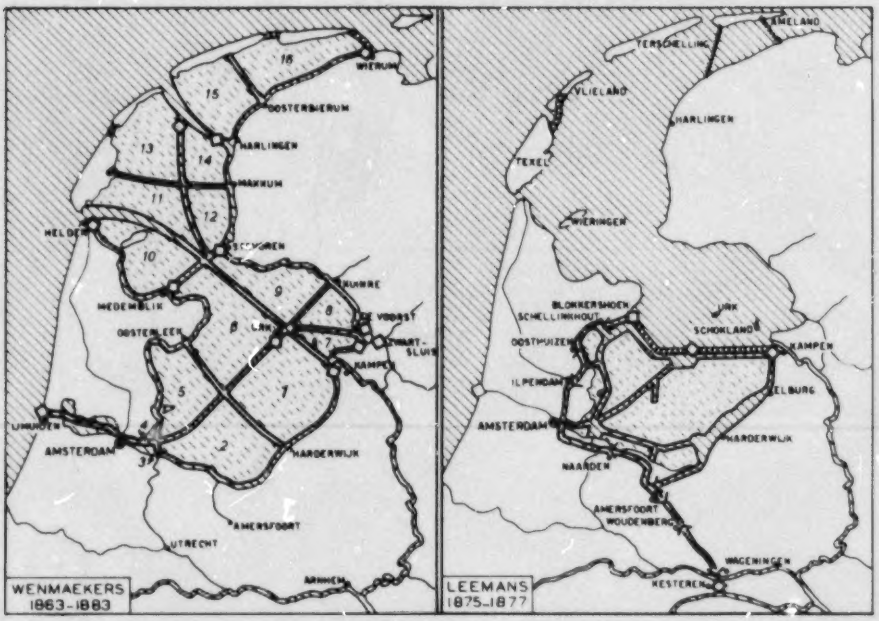


fig. 8

fig. 9

Not until the middle of the 19th century was serious thought again given to the plan. A first plan for enclosing and almost completely draining the Zuyder Zee, combined with a canal linking Amsterdam directly with the North Sea, appeared in 1848 (fig. 6). Subsequently, many more, less expert people let their fantasy run free over the project and very diverse plans were published. According to some of them, not only the Zuyder Zee, but almost the whole of the Wadden Sea would be impoldered (see figs. 7 and 8).

In 1873 a State Committee was appointed to investigate the technical and economic possibilities. The result was a parliamentary bill (1877), which proposed draining the southern part of the Zuyder Zee (the *barrier dam* would be sited to the south of the mouth of the River IJssel) and constructing a canal link between Amsterdam and the Waal (Rhine) through the Valley of Gueldres (fig. 9). The Government fell shortly afterwards and its successor withdrew the bill.

Many people, however, continued to be interested in the idea and this resulted in the establishment in 1886 of the private Zuyder Zee Association, in which C. Lely (1854 - 1929) was to play a leading role. He produced a plan which gave evidence of a greater sense of reality than most of the previous schemes and which was also to form the basis of the scheme that was actually carried out (fig. 10).

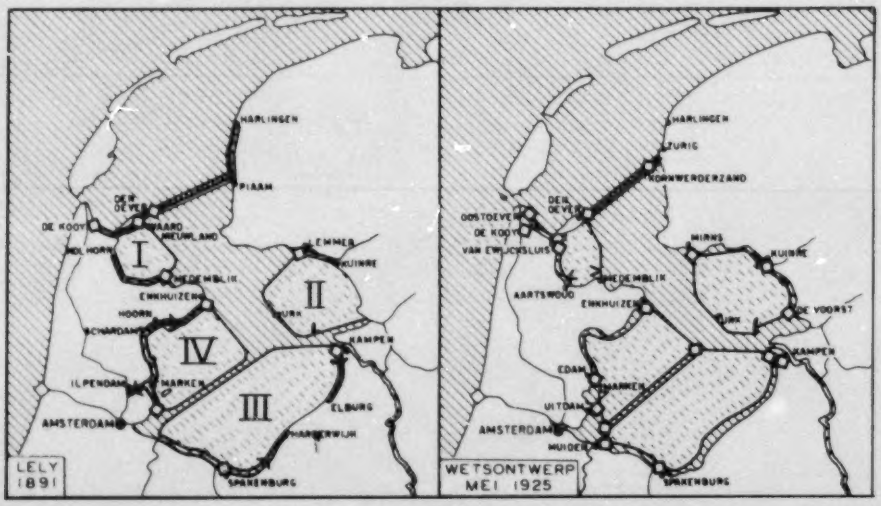


fig. 10

fig. 11

fig. 12 – Depth chart of the Zuyder Zee.

fig. 13 – Soil types in the Zuyder Zee.

Lely proceeded from the premise that, in the first place, it was the most shallow (fig. 12) and most fertile portions (fig. 13) that should be drained. Areas of open water should be left between these reclaimed sections as follows: (a) between polders II and III, to receive the water discharged by the IJssel and Zwarte Water and (b) between polders III and IV to maintain the shipping link between Amsterdam and the north-east Netherlands. The area of the Lake IJssel that was permitted to remain would be determined by the capacity required for the temporary storage of the water discharged by the rivers entering the lake, with due allowance being made for periods of high water and unfavourable wind.

Apart from this the question could be considered of whether or not a barrier dam should be built. Without the existence of one, in Lely's view, the partial reclamation would still be possible, but it would be much more expensive. Moreover, the barrier dam, apart from reducing the flood danger, had important secondary advantages, such as greater control over water discharge, the creation of a freshwater reservoir and a shorter connection between North Holland and Friesland, so that Lely wanted it to be treated as an indispensable part of the plan. He estimated that the whole plan could be completed in 32 years and would cost 190 million guilders.

In 1894 a government committee produced a scheme that differed only in details from that of Lely (who had meanwhile become Minister of Water Affairs), but that government also resigned in the same year and it was not until 1901 that another bill was introduced. This story was repeated once more in 1908. In 1913 a government came to power in which Lely served for the third time as minister, but then the First World War broke out It was just this war, however, which helped to ensure that the plans were at last speedily implemented. The agricultural depression of the 1880's had made the reclamation of new arable land less attractive, but the grain shortages during the war, in which the Netherlands remained neutral, caused a change of views on this matter. Then, when a flood disaster in 1916 struck the low-lying areas around the Zuyder Zee, this was the last straw. In that same year a bill was introduced (the fourth). It was passed in 1918 and signed by H.M. Queen Wilhelmina and five ministers, the first among them, C. Lely, Minister of Water Affairs.

At the beginning of the 1920's some further delay was caused by the post-war economic recession. In the second half of the decade the execution of the plan was put in hand. During the course of these and the following years the project underwent a number of further small modifications, as appears from the bill of 1925 (fig. 11) and the plan as it was ultimately (largely) carried out (fig. 14).

Chapter III – Execution of the Works

Civil engineering works

The construction of the Afsluitdijk (barrier dam) between North Holland and Friesland (see fig. 14) began in 1927 after the island of Wieringen had already been connected with the mainland by means of a 2 1/2 km long dike at the beginning of the 1920's. The construction also began in 1927 of the dike from Wieringen southwards in connection with the draining of the first polder, the Wieringermeer Polder.

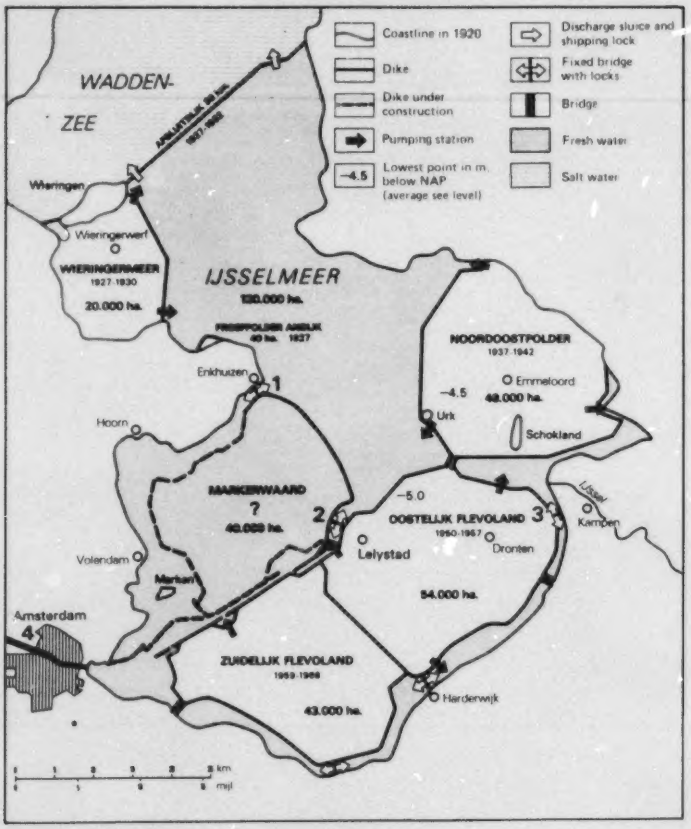


fig. 14 – Overview of the Zuyder Zee works.

This was, in fact, not the first polder, because there fell dry in 1927 near the small North Holland village of Andijk a 40 hectare pilot polder, where it was possible to carry out the first experiments with the drained sea floor, such as investigation of the drying out and shrinkage of the soil, drainage and desalination, cultivation, choice of crops etc. During the course of time this research, under the aegis of the IJsselmeer Polders Development Authority, has been considerably expanded. The authority has at its disposal laboratories and experimental farms for the purpose of agricultural research. In addition, research has been and is being carried out in the fields of land subdivision and rural planning, recreational needs and potentialities, quality of the surface water etc.

During 1930, still before the barrier dam had been closed, two pumps had completed the drainage of the Wieringermeer in 6 1/2 months. Unfortunately, this task had to be repeated in 1945 after the German troops had inundated the Wieringermeer by blowing up the dike a few weeks before the end of the Second World War. Because of differences in the level of the sea floor, the Wieringermeer was divided into three sections, each with its own groundwater level.

On 28th May 1932 the final gap in the barrier dam was closed. The tidal currents were particularly strong through the last openings, so that it was very fortunate that *boulder clay* could be used for the core of the dike. This is a tough, compact glacial deposit which occurs over much of the northern part of Lake IJssel (fig. 15). After construction of the core, the dam was made higher and broader with sand and reinforced with mattresses of willow branches weighted down with stones, faced with clay and blocks of basalt.

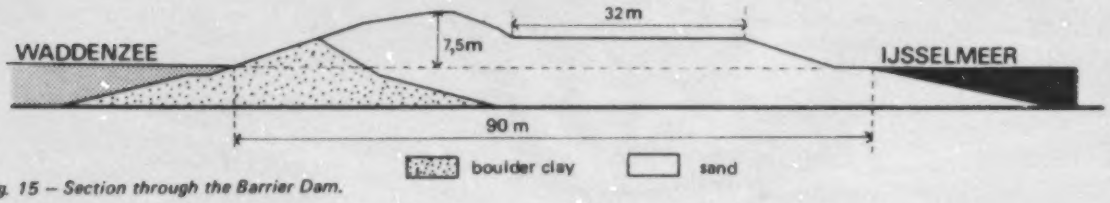
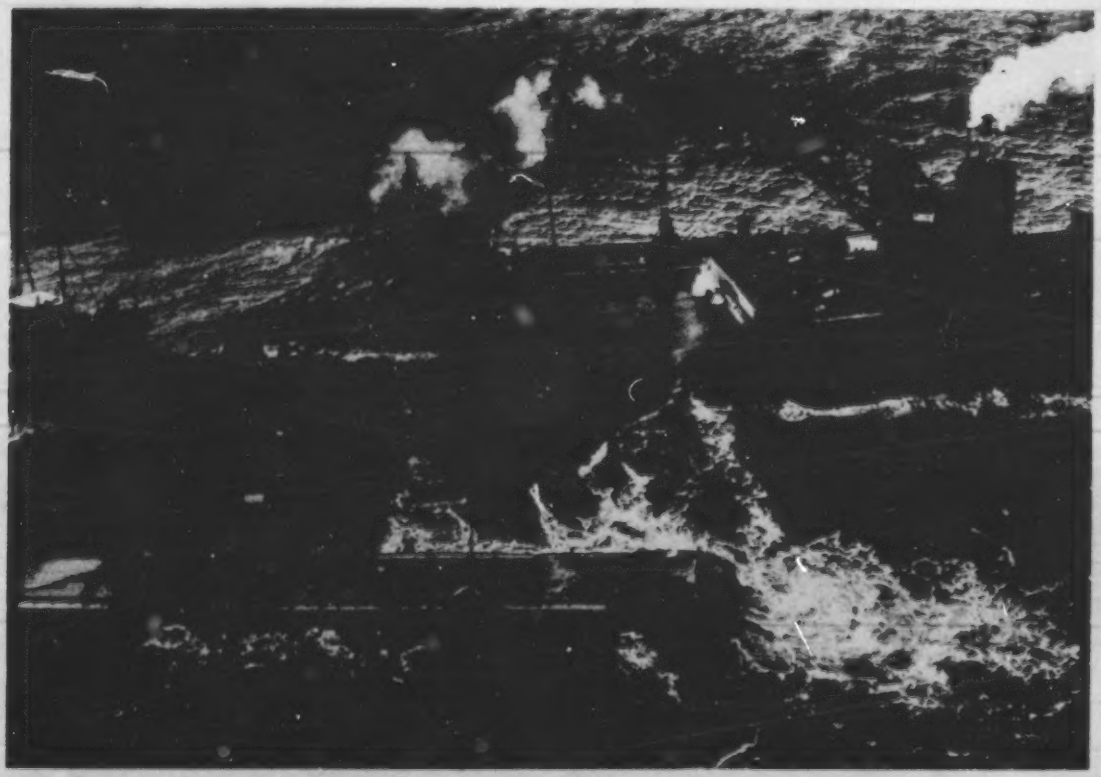
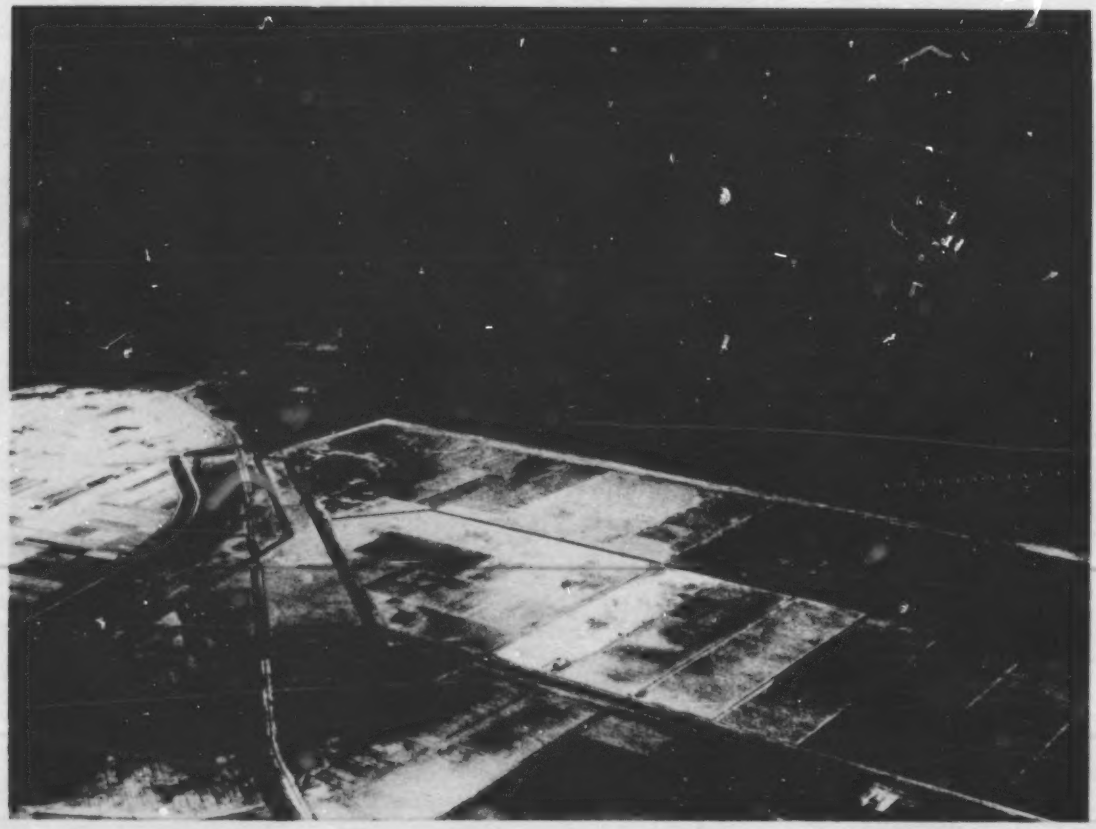


fig. 15 – Section through the Barrier Dam.

The site of the historic closing of the dam (photograph II) is marked by a monument with a look-out tower, decorated with a relief of dike-builders. A motorway was constructed on the 32 metres wide flat crown of the dike. At both ends of the dike allowance was made for both water and shipping to pass through the dike. Near Wieringen fifteen discharge sluices and a shipping lock were built; near the Frisian coast ten discharge sluices and two shipping locks.



photograph II – *Closing of the final gap in the barrier dam, May 1932.*



photograph III — *Infra-red photograph of the 28 kilometre-long barrier dam at the beginning of the 1930's, (looking N.E.), with, left, the Wadden Sea and right, Lake IJssel. Left, the head of the island of Wieringen with, adjoining the discharge sluices and shipping locks in the barrier dam, under construction. In the foreground, the Wieringermeer Polder at an early stage of reclamation.*

These permit the water reaching Lake IJssel through precipitation and from the rivers to be discharged into the Wadden Sea, while the fishermen from the former Zuyder Zee ports can carry on their occupation on the North Sea (see photograph XVIII, p. 48).

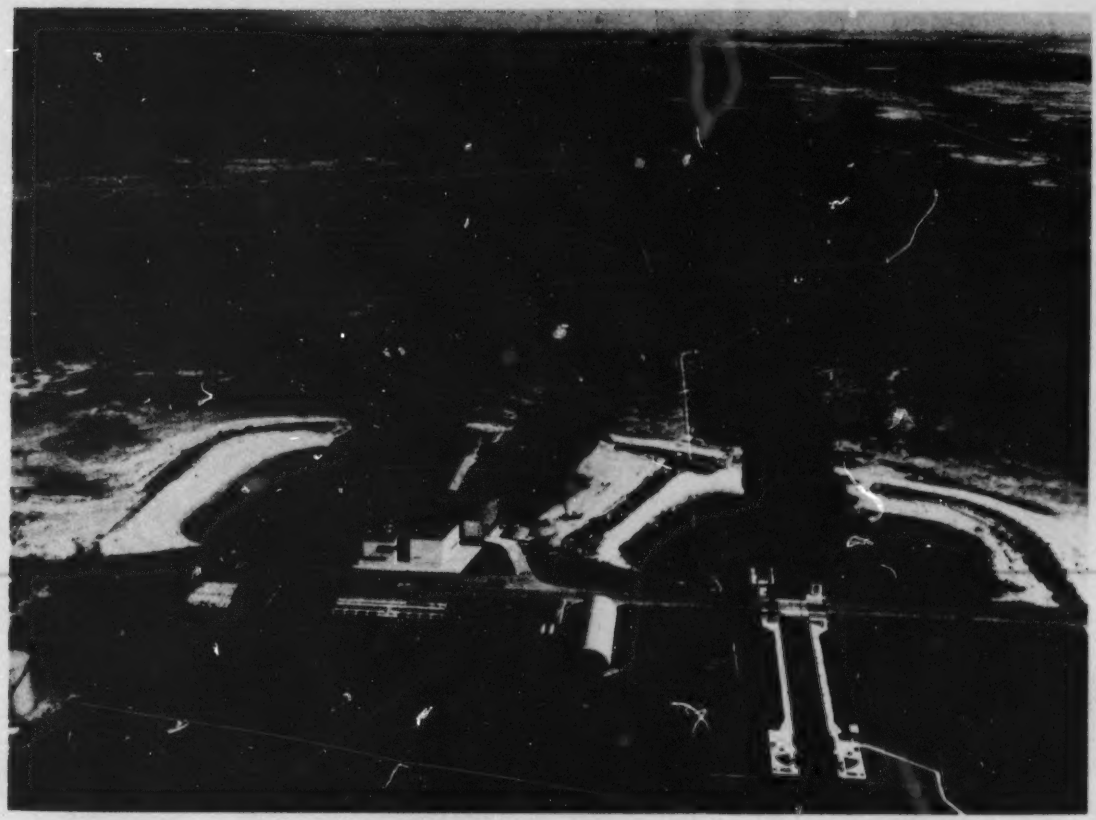
In 1937 began the draining, according to the tried procedure, of the North East Polder, which is more than twice as large as the Wieringermeer. First a dike was built, consisting of two parallel strips infilled with sand (a mixture of sand and water transported under pressure, photograph IV). When the dyke had been completed, three pumps could begin discharging the 1500 million cubic metres of water, a task that was finished in 1942, during the war. In this way, the islands of Urk and Schokland became part of the mainland (photographs XXVI and XXVII, p. 61).

In 1950 a start was made on the drainage of *Eastern Flevoland*, which was completed in 1957. In contrast to the method employed for the Wieringermeer and the North East Polder, a dike was here built round the whole of the area to be reclaimed, so that a peripheral lake was left between the polder and the mainland. One of the reasons for this was the greater difference in height between the two areas. Without the peripheral lake the groundwater table in the adjoining higher areas, such as the Veluwe, would fall too far. There had been unpleasant experiences of this with the earlier polders (drying out and shrinkage of the soil, subsidence of buildings etc.) and that in spite of the fact that there the neighbouring "old land" consists of low-lying polders with a groundwater table that can be regulated.

photograph IV – *Building of a polder ring dike. First, two parallel dams are constructed of boulder clay. The body of the dike is then built up between these two dams. The filling consists of a mixture of sand and water transported under pressure.*

In addition, the peripheral lakes of the southern IJsselmeer Polders make possible the discharge of water from the old and new land (but unfortunately also the discharge of industrial and agricultural effluent), while they are also used for shipping, water sports and recreation along their banks (photographs IX, p. 24 and XXIII, p. 55).

It was orginally planned that the next stage should be the drainage of the Markerwaard, but for reasons which will be explained later, Southern Flevoland was given priority at the last moment. Since the south-eastern dike of the Markerwaard had meanwhile already been largely completed, it was taken into use as the north-western dike of Southern Flevoland (see Fig. 14). At a later stage, the Oostvaarderdiep running between these polders will here ensure that the shipping route remains open from Amsterdam to Lake IJssel.



photograph V — *de Block van Kuffeler Pumping Station in the north-western ring dike of Southern Flevoland, (looking S.E.), shortly after this polder fell dry (in 1968). In the right foreground, the lifting bridge over the shipping lock. In the polder, the drainage canals, excavated under water before the polder fell dry.*

Whereas three pumping stations were built for the purpose of draining Eastern Flevoland, with Southern Flevoland only one pumping station was employed for this task (photograph V). The polder fell dry in 1968 and now only the Markerwaard remains (see Chapter IX). Eastern and Southern Flevoland form a single unit from the water engineering point of view, so that four pumping stations are now available to keep these polders dry.

Two government bodies are responsible for the organisation of operations. The Zuyder Zee Project Department (Dienst der Zuiderzeewerken) is in charge of the civil engineering works, while the IJsselmeer Polder Development Authority (Rijksdienst voor de IJsselmeerpolders) takes care of the planning, setlement and further development of the polders. Both bodies are under the jurisdiction of the Ministry of Traffic and Water Affairs.

Reclamation Activities

Pumping dry the polders brings above the water an impassable mud flat. Many more years are needed to make of this a planned and inhabited landscape (see timetable, fig. 16). The work begins when the polder is still under water and the *ring dike* is under construction. Floating dredgers excavate under the water a system of main waterways leading to the pumping stations, which will soon have the task of draining the polder (photograph V). There must obviously be ready by then in broad outline a lay-out plan based upon investigations of such matters as soil quality, depth and proposed use of the polder.

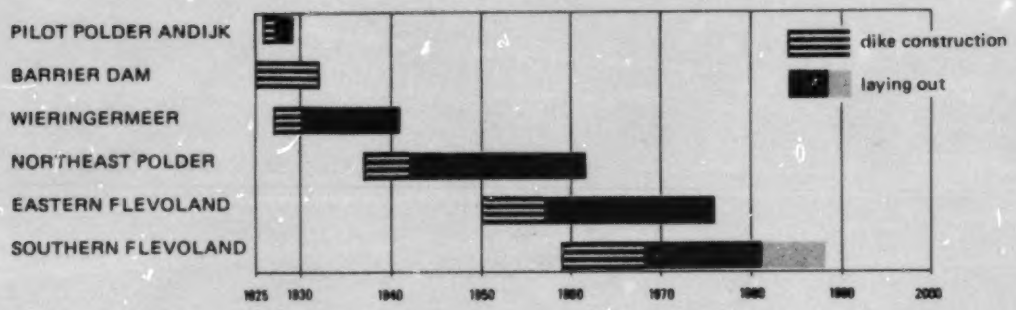


fig. 16 – Phasing of the Zuyder Zee works.

As soon as the ground has fallen dry, reeds are sown from aircraft. This crop helps to make the ground drier (transpiration) and firmer and prevents the growth of weeds, the seeds of which are carried by the wind. When, after a few years, the ground is sufficiently firm, during which time the surface may have subsided locally by half a metre, the reeds can be cut or burned, so that cultivation can begin. It is very important to be able to predict the amount of subsidence of the ground in connection with the construction of locks, pumping stations etc.

photograph VI – *The North East Polder at the beginning of the 1950's. The lay-out is more or less finished, the landscape is still bare and open (cf. photograph XXV, p. 60).*
Bottom left, the village of Luttelgeest; in the background, the old coastline and the peat district of North-west Overijssel (looking N.E.).

photcgraph VII – *Deep ploughing. If necessary the soil profile can be turned to a depth of 2 metres.*

As soon as it is possible to get on to the land, ditches are excavated at approximately 10 metre intervals to deal with the finer drainage. After about three years, when the ground has sufficiently dried out and "ripened" (better soil structure), the ditches are replaced by field drains, formerly of porous earthenware, but now of perforated plastic. Less wet areas are sometimes provided immediately with field drains (in the North East Polder alone the length of the pipe network is sufficient to go round the world).
Subsequently all the other elements of the cultural landscape have to be fitted into place: roads, bridges, farms, villages etc. (photograph VI).

During the first five years farming is carried out in the form of exploitation by the state. Subsequently, the land is granted out, largely on short or long-term lease. The criteria for the selection of the farming population (there have always been many more candidates than available holdings) have not always been the same. With the Wieringermeer all that mattered were the interests of agriculture in the polder and therefore the sole determining criteria were such things as competence at the job, social qualities and financial soundness. With the later polders a compromise was sought between the interests of the new and the old land, in the sense that, at present, three quarters of the holdings are reserved for people who have lost their farms elsewhere in the country as a result of farm consolidation schemes, urban expansion, road construction etc.

Both the reclamation and the farming activities are highly mechanised (photograph VII). In the Wieringermeer and the North East polders, reclaimed during the years of economic depression and war, much work was still done with hand and spade. After the Second Wolrd War, steeply rising wage costs made it necessary to reduce the labour factor where possible.

Chapter IV – The significance for the Netherlands

Such an extensive project naturally has many consequences, both for the radically changing Zuyder Zee region itself and for the surrounding "old land". It is equally obvious that not all of these consequences are advantageous, but that there are also disadvantages.
In the following sections we shall first examine the consequences of the Zuyder Zee project from the water management point of view, then the consequences for traffic and for fishing and, lastly the use that is made of the newly reclaimed land.

a. Consequences for water management

In the sphere of water management attention should of course first be drawn to the greater *safety* that the barrier dam guarantees to the whole of the region. Floods like that of 1916 can no longer occur, as appeared from the exceptional conditions in 1953 which caused a disaster in the south-west Netherlands. The barrier dam was damaged, but it did not give way. It was decided after this experience, however, to raise the dike considerably. The dikes along the Wadden Sea coasts of North Holland and Friesland had already been strengthened earlier, since the water here can be piled up to a much greater height following the enclosure of the Zuyder Zee. Set against this is the fact that the dikes of the new polders and the 300 km. of dikes along the old coast of the Zuyder Zee need to be less massive and also require less maintenance.

Not only has the water to be turned back, however; it is also used. The parts of Lake IJssel which remain are of great importance for the farms and for water supply. This refers not only to the new polders, but also to the "old land" around Lake IJssel. An important aspect in this connection is the reduction of *salination*. Although the low-lying coastal zone of the northern Netherlands has been protected against flooding by dikes, the salt water nevertheless penetrates under the dike into the groundwater of the polders, which is a great danger to the farms there.

This danger has now been considerably reduced in the Lake IJssel region, since the precipitation and the rivers ensured that, in a few years (1937), Lake IJssel became a freshwater lake. During dry years it is even possible to let water out of Lake IJssel into the polders and polder waters of the old land, so that there an improvement has been achieved in the water economy, both qualitatively and quantitatively.

Because salt or brackish groundwater occurs at a greater depth under the whole of the northern and western Netherlands, there is the remarkable situation that salt is a greater nuisance in the peripheral lakes in the south of Lake IJssel than in the surviving northern part of the lake. This is because so much freshwater has to be pumped away to keep the new polders dry that the deeper-lying saltwater has the chance to rise to the surface. In order to protect the northern part of Lake IJssel from the adverse effects of this salt, locks have been built at three places (1, 2 and 3 on fig. 14, p. 11) to separate the peripheral lakes from the northern part of the lake and the water of the peripheral lakes is discharged as far as possible through the North Sea Canal (4).

Water supply is giving rise to an increasing number of problems in the low-lying part of the Netherlands (i.e. north and west of the country). Some of these problems are concerned with quantity, since consumption is increasing at a much faster rate than the population growth, but there are also problems related to quality. Increasing use must be made of surface water rather than groundwater, but the former is becoming increasingly polluted. Since the degree of pollution of the surface water varies with the water level of the rivers, it is important to construct reservoirs to compensate for periods of low water in the rivers.

The Structure Scheme for Domestic and Industrial Water Supply of 1972 mentions as possibilities the construction of a reservoir in Southern Flevoland to store both ground and surface water (area 600 ha., capacity 30 million cu.m.) and a much larger reservoir in the unreclaimed section of Lake IJssel, abutting on the dike linking Enkhuizen and Lelystad. This reservoir, fed with Lake IJssel water, would have an area of 70 km2 and a capacity of 500 million cu.m. The construction of a reservoir enclosed by dikes is preferable to the direct tapping of water from Lake IJssel, because the quality of the latter fluctuates greatly and is also threatened by disasters.

In all this it should be remembered that the water economy of the Lake IJssel region cannot be considered separately from that of the remainder of the Netherlands.

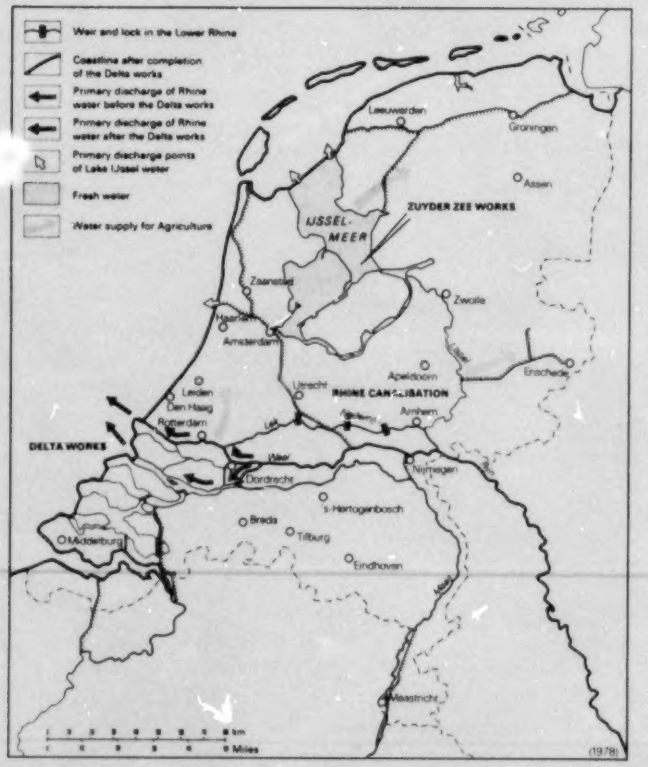


fig. 17 – Overview of the Netherlands' water economy.

Rivers entering Lake IJssel have a catchment area which embraces a large part of the northern and eastern Netherlands and even a part of West Germany. The most important of these is the IJssel (fig. 17), an arm of the Rhine which discharges about 10% of the water of that river. The remaining 90% reaches the sea via the Lower Rhine and the Waal. Since the construction of three weirs in the Rhine (Rhine canalisation) and of dams, some of them with discharge sluices, in the estuaries of the south-west Netherlands under the Delta Plan, it has been possible to regulate closely the quantities of Rhine water reaching the sea via the IJssel and Lake IJssel, the New Waterway (past Rotterdam) and Haringvliet (Delta region), respectively, and adjust them as circumstances demand.

b. Consequences for traffic

Water transport – Like the former Zuyder Zee, Lake IJssel forms an important inland waterways link between, for example, Amsterdam and the North East Netherlands. Since the completion of the dike between Enkhuizen and Lelystad boats have to pass through the locks at one of these two places. The more important of these locks are the Houtrib Locks near Lelystad. An advantage for shipping is that, by comparison with the situation before the enclosure of the Zuyder Zee, the calmer water affords greater safety. A disadvantage, however, is that the reduction of currents and lower salinity have resulted in more floating ice in winter.

In the event of the Markerwaard being reclaimed, a broad canal between this polder and Southern Flevoland – the *Oostvaardersdiep* – will ensure the continuation of inland navigation.

Because of the better land communications, the regular ferry services, such as those from Enkhuizen to Stavoren and Urk, largely lost their raison d'être. They became a tourist attraction and are now operated only during the summer months.

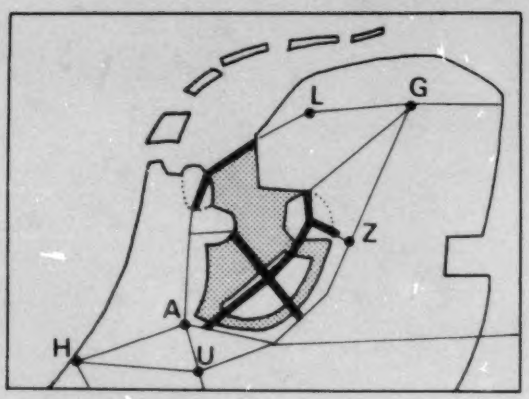
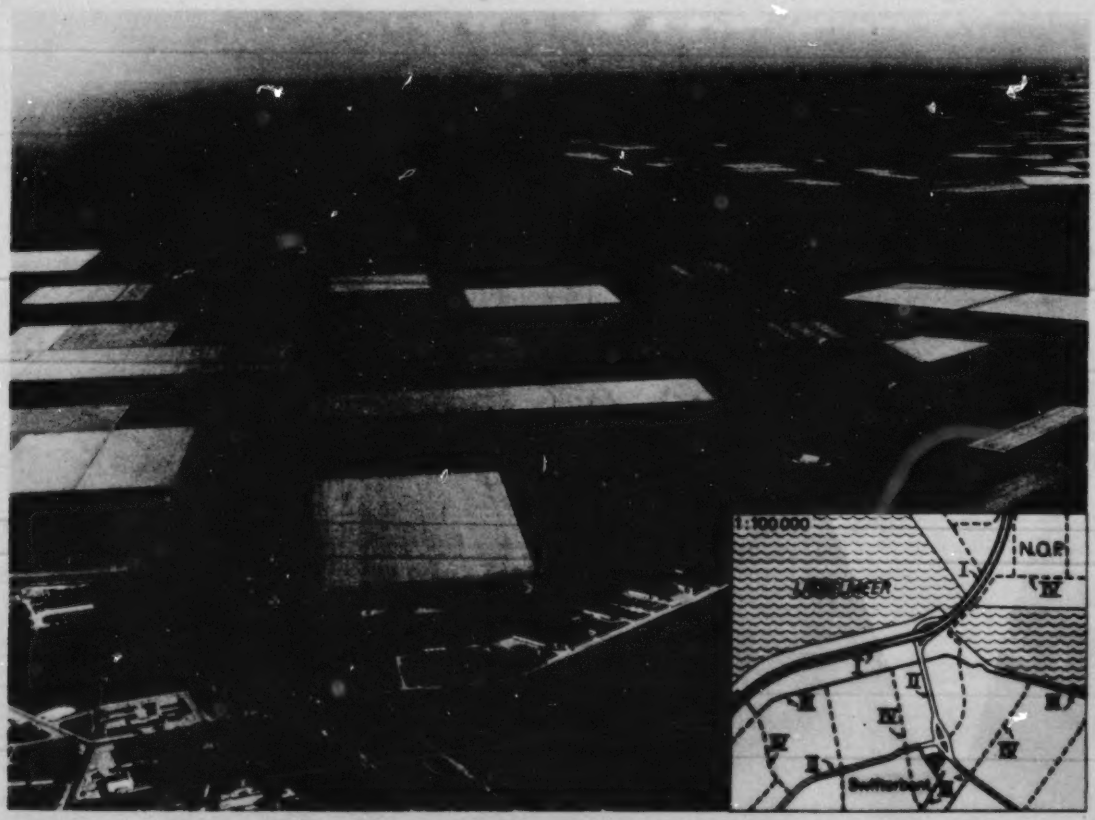


fig. 18 – New traffic links.

Land transport – Reference has already been made to the shortening of the distance between the areas west and north-east of Lake IJssel as a result of the barrier dam (fig. 18). Space was also originally reserved on the barrier dam for a railway. Later the need for such a railway proved too small to justify its construction. Public transport over the barrier dam now takes the form of an hourly bus service between Alkmaar and Leeuwarden/Heerenveen and the space for the railway has been used to provide the motorway with four traffic lanes.



photograph VIII – ***THE KETEL BRIDGE, upper right centre (looking north), between Eastern Flevoland (foreground) and the North East Polder (background), an important link in the new road connection through the polders between the western and north-east Netherlands. In the left foreground part of the village of Swifterbant. Behind, left and right of the road, the standard 300 x 1000 metre parcels.***
The inset map, the central portion of which corresponds with the area shown by the photograph, shows the four categories of road.

Four categories of road are distinguished in the new polders. To give access to the agricultural and recreational areas there are the polder and recreational roads. These connect with the tertiary roads which connect with the secondary roads, which are designed to form the connections between the settlements. Lastly, there are the primary roads, connecting the different regions of the country and providing a considerable reduction of route mileage, such as between the western and north-east Netherlands (see the figures I - IV in the inset-map of photograph VIII).

Immediately before Christmas 1980 work began on the construction of the Flevo Railway, which is planned to link Almere in 1987 and Lelystad in 1988 with Amsterdam (see fig. 30, p. 41). The line is a branch of the railway from Amsterdam to Hilversum and will connect Flevoland with the "old land" by way of a bridge immediately west of the *"Hollandse Brug"* (road bridge over Lake Gooi).

No decision is expected for the present about an extension of the railway at a later stage to Emmeloord and Groningen.

c. Consequences for the fishing industry and further consequences for the old land

Fishing was formerly the main source of income for the inhabitants of most of the smaller and larger places around the Zuyder Zee. Herring and anchovies, in particular, provided considerable, although greatly fluctuating, catches. The execution of the Zuyder Zee project was obviously a vital matter for this section of the Dutch population and it resulted, in many instances, in the extinction of the fishing industry. The Zuyder Zee Support Act of 1925 enabled many older fisherman to leave the industry and made possible the retraining of the younger ones. There is still fishing on Lake IJssel from a few places, such as for eels, but the industry no longer pays very well.

The development was very different, however, on the former island of Urk (now situated in the west of North East Polder, see photographs XXVI and XXVII, p. 61) from where the fishermen sail to fish the North Sea and the Atlantic Ocean on a large scale, making use of the locks in the barrier dam. The modern fishing fleet of Urk comprises the largest number of boats of the Dutch fishing ports.

In other respects, too, the execution of the Zuyder Zee works had an effect on the socio-economic condition in the places situated around Lake IJssel. Some of the effects were of a temporary nature, such as the settlement of Zuyder Zee workers and the organisation of excursions and boat trips during the reclamation of the nearby polders. But there were also consequences of a more permanent kind. Various places around Lake IJssel act as service centres for a section of the polders – although to a decreasing extent – (examples include Lemmer, Kampen and Harderwijk), and/or as centres catering for water sports on or along the marginal lakes (including Muiden, Hoorn, Enkhuizen, Lemmer, Elburg and Harderwijk).

d. Use of the polders

Although detailed attention will be paid in the following chapters to the planning and land use of the new polders, certain general aspects will be discussed here. In particular, reference will be made to the extent to which greatly changing circumstances during the past half century have been reflected in the use made of the newly reclaimed land. These circumstances include:

a – the greatly changed agricultural situation in the Netherlands;
b – the rapid urbanisation;
c – the greater prosperity and mobility of the population;
d – the greatly increased demand for recreational space;
e – the increasing concern for environmental management.

a. *the agricultural situation* – As mentioned in Chapter 2, the food shortages during the First World War were one of the immediate reasons for the partial draining of Lake IJssel. It is understandable, therefore, that the new land in the first two polders (Wieringermeer and North East Polder) was put mainly to agricultural use. The post-war situation, in which the rapidly industrialising Netherlands can no longer feed itself from its own resources (e.g. two thirds of the necessary bread grains are now imported), has led to a different approach.

There were also other contributory factors, such as the steeply rising costs in agriculture and the increasing international integration (Benelux, E.E.C., Development help). All this has resulted in the following:

- farming in the polders shows greater variety and specialisation than previously;
- efforts are being made in every direction to reduce costs.

The former has led to a greater diversity in the forms of agricultural land use, based mainly on the qualities of the soil. In addition to arable farming, there are livestock and mixed farming on soils unsuited to permanent arable farming, as well as various kinds of horticulture. The arable farming, however, is restricted to a limited range of crops, with the emphasis now very much on potatoes, sugar beet and winter wheat.

The second result mentioned above has led to a constant enlargement of the area of parcels and holdings (see fig. 19), although this runs counter to the great demand for holdings, which has partly been met by the provision of small horticultural units. The larger holdings facilitate a high degree of mechanisation, which is an obvious result of the efforts to reduce production costs.

	Wieringermeer	Northeastpolder	E.Flevoland	S. Flevoland
average size of holding (ha., 1971)	36,0	25,6	39,1	–
standard parcels (ha)	20	24	30 – 45	60
Length and width of Standard parcels (m.)	250 × 800	300 × 800	300 × 1000 / 450 × 1000	500 × 1200

fig. 19 – Standard parcels and average size of holding in the Lake IJssel polders.

b. *rapid urbanisation* – With the growth of the population of the Netherlands the proportion of the occupied population engaged in agricultural occupations steadily declined. In recent years there has even been an absolute decline. The decline has naturally been accompanied by a great increase in activities in the secondary and tertiary employment sectors and this phenomenon, in its turn, stimulates urbanisation.

It may be assumed to be well known that the centre of gravity of economic activity in the Netherlands is located in the western coastal provinces and that this has given rise to an area of urban concentration known as the "Randstad Holland". Since it is official policy to prevent as far as possible growth on the inner side of this horse shoe-shaped conurbation, the two Flevo polders, in particular, provide a good possibility for further expansion for the northern section of the Randstad (from Amsterdam to Amersfoort). This is why residential and work areas have been planned in Flevoland for a maximum of 500,000 inhabitants.

In the south-west of the Southern Flevoland polder a city is being built at only a few kilometres distance from Amsterdam, for which the name Almere has been chosen and the main function of which will be to accommodate the overspil from the northern wing of the Randstad. In addition, Lelystad, 30 kilometres further to the north-east is already playing a part here. In the future the Markerwaard may also be important in this respect (see further, Chapters V and VII - IX).

c. *greater prosperity and mobility* – It can be seen from fig. 21, p. 26 that, in the Wieringermeer, *four* villages were built at a relatively short distance from each other. In the North East Polder, apart from the capital of Emmeloord, there were as many as *ten* villages. The planning was always based on the principle that, for economic reasons, the farmhouses should be built on the holdings. In addition, there would be villages with a service function, which would also accommodate the greater proportion of the agricultural workers and their families.

The building of farmhouses on the holdings has social disadvantages for the farmer and his family, such as the need to cover greater distances to reach the shops, school and church, greater difficulty in participating in communal activities, especially for the children, etc. In order to limit these difficulties it was at first decided to build a relatively large number of rather small villages, i.e. priority was given to *accessibility* over *level of services*, which could obviously be higher in larger villages.

Rapid social developments since the war have greatly modified the principles described above. The preference remained for the farmer and his family to live on the holding, but because of the previously mentioned increase in the average size of holding, the number of farmers was smaller than the original estimate. Mechanisation naturally also resulted in a much smaller settlement of agricultural workers. Lastly, increased mobility (car ownership) and changed shopping habits (one weekly visit to a shopping centre with good facilities, made possible by the possession of refrigerators and freezers) resulted in a reduced interest in the small villages.

All this caused a rapid change in the ideas concerning the optimum number of villages. Consequently, we find in the polder of Eastern Flevoland only two villages apart from the larger centres of Dronten and Lelystad.

fig. 20 – Land use in the Lake IJssel polders.

d and e – *recreational space and environmental management* – As elsewhere in the western world recent social developments in the Netherlands have led to an increasingly careful balancing of economic interests against factors related to quality of life, which are more difficult to quantify. Examples are the increasing shortage of space (population density of 415 per square kilometre of land area on 1st Jan. 1980), increased incomes, the greater amount of leisure, the greater mobility of the population, the alarming increase in environmental pollution and the increasing concern with nature and the living environment.

Considerations deriving from these have helped to influence the decisions made about the use of the newest polders. As will be seen from fig. 20, the two Flevo polders are planned to contain considerable areas of woodland, no longer purely for the recreational needs of the polder inhabitants, as with the earlier polders, and then mainly on land unsuitable for farming, but clearly also designed to attract people in search of recreation from other parts of the country.

photograph IX – *Recreation on and along Lake Veluwe, looking S.W., Right, the polder dike of Eastern Flevoland abutting on the artificially created beaches. On the opposite shore the Veluwe in the neighbourhood of Elburg.*

The peripheral lakes are also of great importance in this connection. Further space is also reserved for such things as a fish farm (for the benefit of amateur fishermen in the whole of the Netherlands), nature reserves (notably birds) etc.

From all this it appears clearly what a complete change there has been in the ideas concerning the planning and use of the polders, particularly in the decades since 1945. The agricultural interests play a less dominant part. In the planning of the landscape the number of villages has constantly declined and the area devoted to recreation and nature conservation has constantly increased. Lastly, the influence of the large cities has made itself felt in the planning.

An important aspect in all this is that the enlargement of scale which is everywhere observable has evidently not left unaffacted the framework within which the planning is placed. Before 1945, the polders (Wieringermeer and North East Polder) were seen as independent units. They formed welcome, but isolated additions to the agricultural area of the Netherlands. The planning of the southern IJsselmeer polders is now treated much more in a national context, in which it is no longer only the agricultural aspects which count.

The above considerations have even set a discussion in train concerning the last polder – the Markerwaard – in which the point at issue is the desirability of creating the polder in the proposed form (see further, Chapter IX).

Chapter V – The Wieringermeer

Planning

When in 1930, after six months of pumping, this polder fell dry, for the first time in the history of the Zuyder Zee works, the task had to be faced of making a large area of drained sea floor usable and laying it out. Although this was an interesting challenge, because the opportunity did not often present itself of creating a region both literally and figuratively "from the ground up", the planner was in danger of feeling abandoned in an area with so little to guide him and of being weighed down by the magnitude of the consequences of possibly erroneous or less fortunate decisions.

There did exist a number of basic data to serve as a starting point. These included the polder's shape and its location in relation to communications, the settlements around its periphery, the elevation and the characteristics of the soil, the proposed use of the new land and the population this would require.

Before the plans could be carried out, steps had to be taken to increase the firmness of the soil and to remove the salt from it, since the barrier dam was not completed until two years later, which meant that the Wieringermeer was washed over until the last by salt water (this problem did not arise with the later polders).

In many respects this first large Zuyder Zee polder formed a "test bed" for the later polders as far as the planning and reclamation of the land were concerned. Various solutions which were worked out here as an answer to the often unexpected problems could be applied again in the later reclaimed polders.

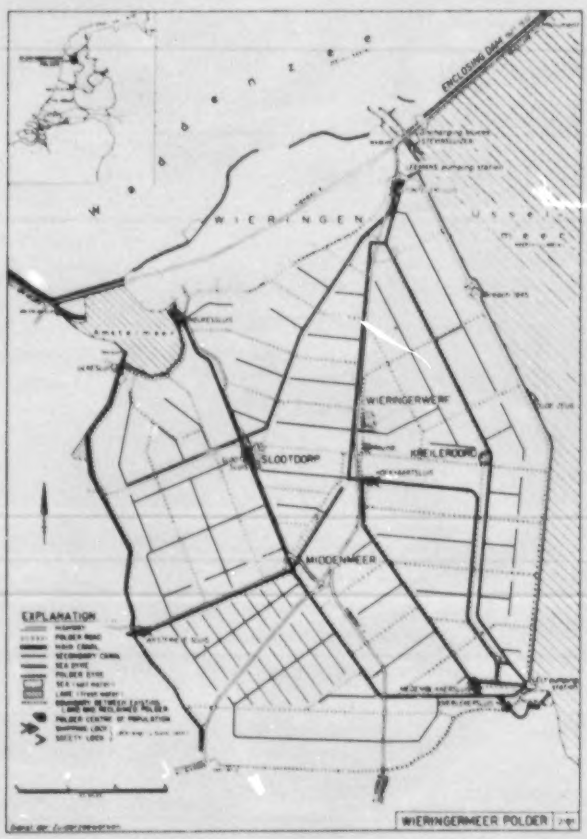


fig. 21 – Reference map of the Wieringermeer.

Fig. 21 shows in map form the outcome of the plans that were finally carried out. The area was divided into three polder sections, each with its own groundwater level, so that nearly everywhere it was possible to achieve the agriculturally desirable groundwater table of 1.40 metres below the land surface. The pattern of roads and canals was largely determined by the way in which the land was divided into parcels. The standard parcel was an area of land measuring 250 x 800 metres (= 20 hectares, which fitted in with the original intention of creating farm units of 20, 40 and 60 hectares.

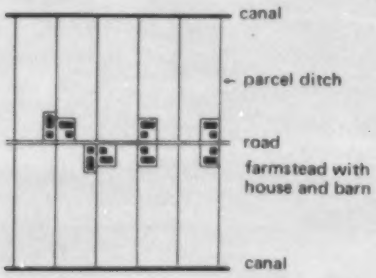


fig. 22 – Diagram of blocks of parcels.

The parcels were so arranged that they all had one side bordering on a road (along which the farmsteads were also built) and the other side bordering on the water. Fig. 22 shows this pattern of parcels at a larger scale. The principle has been adhered to for all the polders. The principle of parcels in elongated blocks derives from the attempt to reduce access and drainage costs to the minimum and to create the optimum possibilities for the use of agricultural machinery. In this way there arose a network of roads and *canals* running parallel with each other at 1600 metre intervals. Trees were planted along most of the roads, as well as around the farmsteads. The trees function not only as a vertical element in the otherwise wholly horizontal landscape, but also serve to break the wind, which otherwise has free play in this flat countryside.

In deciding the *land use* the planners were largely guided by the differences in soil quality. In the north of the polder, for example, where sandy soils predominate, a wood of 400 hectares was planted. For the rest, in accordance with the aims of the reclamation scheme, the land was taken into use mainly for arable farming, although some small areas were zoned for livestock farming and market gardening.

Settlements

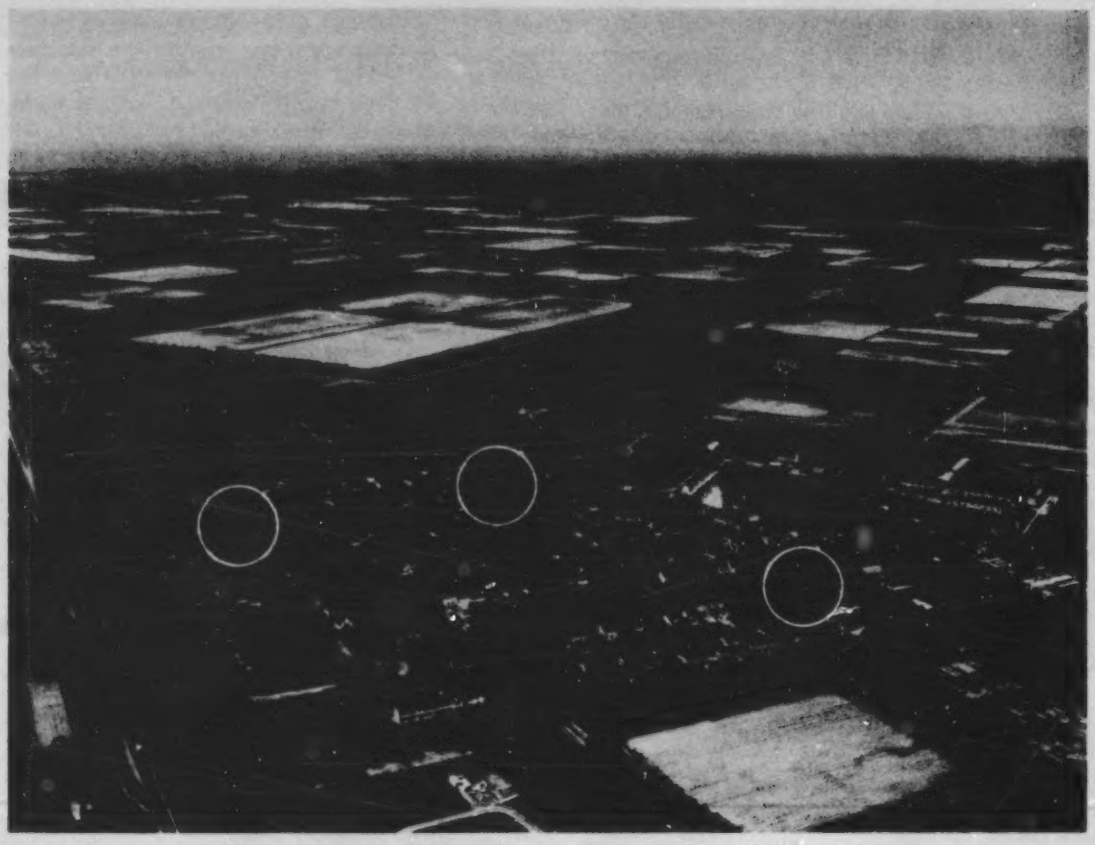
It is apparent that the physical planning of the Wieringermeer was guided mainly by the criteria determined by the optium subdivision of the agricultural land. It was even assumed at first that villages would develop "spontaneously" at selfevident locations, such as important road crossings. Only when that proved not to be the case did a number of villages have to be inserted into the already existing pattern. Thus initially three villages were built: Middenmeer, Slootdorp and Wieringerwerf, but the location of these soon proved to be not ideal. As fig. 21 shows, the villages lie quite close together in the middle of the polder, so that their service areas partly overlap, while the distance to a village for the population of the peripheral areas is often considerable. In order to overcome this last objection to some extent, a fourth village (Kreileroord) was added later.

A second objection is that the polder lacks a definite centre, while each of the villages is too small in itself to achieve a reasonable level of service provision. Moreover, the population of the polder has remained below the original estimate of 12 - 18,000 (12,235 inh. at 1st January 1980). The secterianism of Dutch society has also had an unfavourable effect on the planning of these small villages. By this is meant that, in the Netherlands, religious divisions make themselves very strongly felt in many social fields, such as politics, education, societies etc. Since the population of the IJsselmeer polders forms a cross-section of the total Dutch population, this means that each village, irrespective of size, will certainly contain two or three churches, schools etc. (photograph X).

40 hectares of land have been reserved for each village, so that in addition to housing land, sufficient land remains for open spaces, sports grounds and possible light industry.

In 1941, after a period of reclamation and colonisation lasting 11 years, it was considered that the time had come to constitute the Wieringermeer, a municipality in the province of North Holland, with the village of Wieringerwerf as its administrative centre.

The former island of Wieringen, which is a separate municipality, has little employment for its inhabitants, nearly half of whom have to find work elsewhere. Recreational potential, however (mainly watersports) offers favourable prospects.



photograph X – *Wieringerwerf, administrative centre of the municipality of Wieringermeer, looking N.E. The E 10 motorway (Amsterdam-Afsluitdijk) is just visible bottom left. Note the siting of the three widely spaced churches. In the background the standard 250 x 800 metre parcels.*

The course of population change in the Wieringermeer over the past ten years presents a remarkable picture. A sharp increase in the first half of the decade was followed by a slower growth up to 1979 and then even a decrease.

Wieringermeer Population Change 1971-1981

Population on 1st January and annual increase or decrease					
1971	9608	+ 280	1977	12076	+ 138
1972	9888	+ 551	1978	12214	+ 71
1973	10439	+ 482	1979	12285	– 50
1974	10921	+ 737	1980	12235	–100
1975	11658	+ 212	1981	12135	
1976	11870	+ 206			

Source: CBS

The sharp increase during the period 1972-1974 was mainly the result of the settlement of home-seekers from the Amsterdam region, who settled in the villages of the Wieringermeer and continued to work in Amsterdam (the commuting distance is about 60 km). The inclination to do this has rapidly declined, mainly because of the steep rise in petrol prices since 1974. In recent years there has even been a migration loss as a result of many young people leaving the polder in search of work.

Chapter VI – The North East Polder

The construction of the dikes of this polder began in 1937, the polder fell dry in 1942 and the laying out could begin after the Second World War.

Just as in the Wieringermeer, preference was given for economic reasons to building the farmsteads on the holdings. For some of the farmworkers, houses were built in the vicinity of the farms, while for the remaining farmworkers and for the non-agricultural section of the occupied population, villages were planned.

The parcels here were larger than in the Wieringermeer: 300 x 800 metres, i.e. 24 hectares, which is the most frequently occurring size of holding. Apart from a number of small horticultural holdings, the other holdings vary in size from 12 to 48 hectares. Here too, nearly all the parcels have one short side bordering on the road and the other on the water (see photograph VI, p. 16).

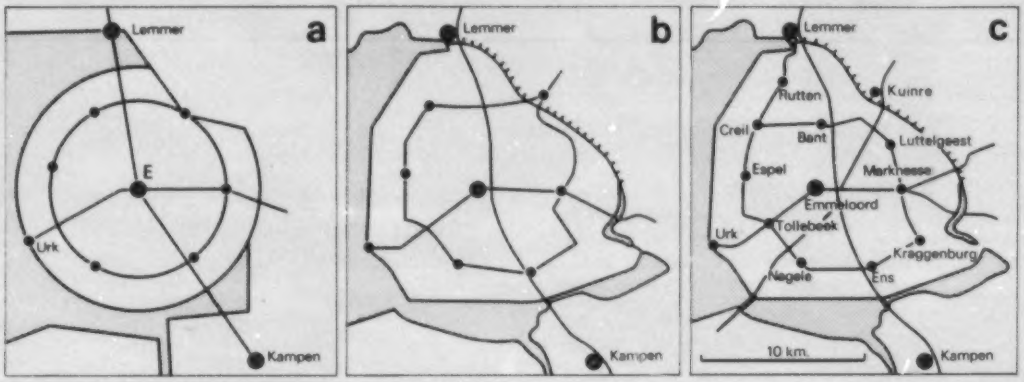


fig. 23 – Planning of the settlements in the North East Polder (after Christaller)

a – geometrical diagram of the settlement pattern
b – plan with five new villages
c – the revised plan as carried out

In planning the North East Polder, the planners wished to avoid a repetition of the not very successful planning of the centres in the Wieringermeer. A very systematic plan was drawn up, as shown in fig. 23. In the more or less circular polder, two road axes at right angles form the skeleton of the road network: from north to south, the road from Lemmer to Kampen, which forms at the same time a shorter connection for the through traffic between these two parts of the "old land"; from west to east, a road connecting the existing fishing port of Urk with the mainland. The central settlement of the polder (Emmeloord) has been planned at the intersection of these two roads, which is also the central point of the drainage system.

The smaller service centres lie in a circle around it and are connected with each other by a ring road and by a series of radial roads to the central place. In broad outline this plan is a practical application of the model of Christaller *), in which, in addition to the central place of Emmeloord, a ring of six villages were to be created, including the already existing village of Kuinre on the "old land".

Meanwhile, in somewhat comparable arable farming areas on the "old land", a sociological investigation was carried out among the farming population into what should be the maximum distance from the farm to the nearest village. Since the result proved to be a maximum of five kilometres (the farmers did not yet own motor cars, nor are the inhabitants of the small-scale Netherlands accustomed to long distances !), the number of villages was increased from five to ten, in addition to Kuinre, Urk and Emmeloord. The nucleus of each of these villages would have a population between 1,000 and 2,000.

With a population of the surrounding rural area of between 2,000 and 3,000, the service area of each village would contain an average of 4,000 people. Together with the expected 10,000 inhabitants of Emmeloord this gave an estimated total population of 50,000.

*) W. Christaller: die Zentralen Orten in Süddeutschland, Jena, 1933.

Fig. 24 shows that this plan has been largely carried out, although with the addition to the road network of the motorway from Amsterdam to the north-east Netherlands (the bridge connection between the North East Polder and Eastern Flevoland was not originally included in the plans). The form of the traffic network was adapted to the form of the polder as a whole and to that of the parcels, where the straight line naturally plays a greater part than the circle.

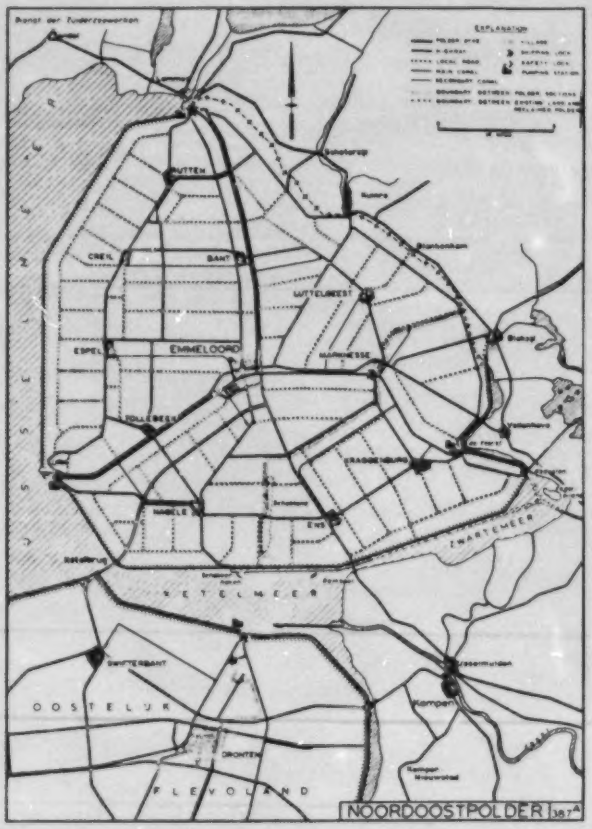


fig. 24 – Reference map of the North East Polder.

The North East Polder also shows a close resemblance to the Wieringermeer as far as land use is concerned (predominantly arable farming, see fig. 20, p. 23), although there is rather more variation in the North East Polder. In addition to purely arable holdings, we also find there, particularly around the periphery, mixed holdings where some of the land is used for grazing animals. There is also for example more flower and fruit growing on horticultural holdings here than in the Wieringermeer polder.

The spatial distribution of these forms of land use is largely determined by the nature of the soil. The clay soils in the centre of the polder are used entirely for arable farming. Along the periphery, where light soils often occur, also pastures are to be found. Woods have been planted in a few areas with excessively sandy soil while horticultural holdings are to be found in the areas with the best soils.

The farmsteads and, particularly, the attached barns all look strikingly alike, because they were built by prefabricated methods as a consequence of the shortage of building workers after the war, when the latter were needed to repair war damage and make good the backlog in house building (photo XI). Nevertheless, the 2,000 hectares of woods and plantations, now a few decades old, form a landscape that is in many places certainly not unattractive. The two largest woodland areas lie on the eastern margin of the polder. The remainder of the planting is concentrated around the villages and farmsteads, and along the roads.

photograph XI — *Farm in the North East Polder, near Marknesse. Right, the barn constructed of prefabricated concrete elements.*

Despite all the careful planning, the villages do not present a very cheerful picture. The continuing mechanisation of agriculture, particularly after the Second World War, was the main reason why here, too, the population remained considerably below the estimates. Instead of the expected 50,000, the North East Polder (on 1st January 1980) had a population of 27,400 (excluding the 10,200 inhabitants of the former island of Urk).

Apart from the more than 18,000 inhabitants of Emmeloord, only in the villages of Marknesse, Ens and Nagele is the population in excess of 1,000. In the other seven villages it lies between 600 and 800.
Socio-economic changes, previously described, such as the greater mobility of the population, the higher demands made on the provision of services and the related changes in shopping habits clearly work to the disadvantage of these small villages (see Chapter IV).

Nevertheless, since the end of the 1970's the majority of the villages are again exhibiting a modest growth. This is mainly because of the settlement of people working in Emmeloord who are unable to find a house there because of the housing shortage.

In marked contrast to the stagnating growth of the villages is the flourishing growth of Emmeloord. This place offers its inhabitants a wide range of services, including a shopping street with a wide range of shops, churches, schools of many types, a hospital and a theatre (see photographs XII and XIX, p. 49).

Sources of employment for the population include the administrative offices for the North East Polder, commerce and other services, and industry (light metal industry, partly servicing agriculture, as well as agricultural products industries and manufacture of building materials). This industry helped to provide employment for the rapidly growing number of workers in the polder, resulting from the mechanisation of agriculture and the great natural increase in the population, particularly during the early years of colonisation.

photograph XII — *Emmeloord, looking N.E. Right, the industrial zone along the Urk canal; centre, near the water tower, the town centre; left background, parks and playing fields.*

Emmeloord is also highly satisfying as a piece of town planning. The town is spaciously laid out around a central square, with a 60 metre high water-tower as a focal point, ingeniously disguised as a belfry. The tower forms a landmark visible from almost the whole of the polder, forming as it were a symbol of the attraction of Emmeloord. Between 1955 and 1980 the population of the whole polder increased by 76% , that of Emmeloord by 178%.

Since 1962 Emmeloord has been the seat of the municipal administration, which covers the whole of the North East Polder. It provisionally forms part of the province of Overijssel.

Lastly, a quite special place is occupied by the island of Urk, which has derived its importance from fishing for many centuries. As has already been described, the execution of the damming and reclamation works did not adversely affect this activity. On the contrary, Urk with over 10,000 inhabitants and 135 fishing boats is now the most important fishing port of the Netherlands.

The fate of the former island of Schokland was quite different. This island was constantly encroached upon by the sea during the course of the centuries and its last inhabitants left in 1858. The reason for the quite different course of events between Urk and Schokland lies in the nature of the soil. Urk is built on an inlier of boulder clay, while Schokland is situated in an area of clay and peat.

Chapter VII – Eastern Flevoland

Construction

The execution of the works for draining Eastern Flevoland began in 1950. The area fell dry in 1957 after the completion of the construction of the 90 kilometre-long dike, three pumping stations and two locks and 9 months of pumping.

A striking difference from the two previous polders is the periphal lake, varying in width from 300 to 2700 metres, which separates the polder from the mainland (see Chapter III, p. 13, and photograph IX, p. 24). As in this polder roads for the first time were constructed along the ringdike. Since the bottom slopes down from −2 metres near the coast to −4 metres in the north-west, two polder sectors were formed, each with its own groundwater table.

The total costs of draining and laying out Eastern Flevoland were estimated at 18,000 guilders per hectare in 1967, i.e. a total outlay of 972 million guilders (Lely budgetted the total costs of the Zuyder Zee project at 190 million guilders at the end of the 19th century!).

Planning

Since the percentage of soils suitable for agriculture is here still larger than in the Wieringermeer and the North East Polder, it is understandable that the initial thoughts were of a predominantly agricultural use for the polder. Consequently, the early plans for the layout of the area differ only in detail from that of the previous polders. The parcels of the agricultural holdings, to be used mainly for arable farming, are arranged in the customary manner, except that the standard parcel size has been somewhat increased yet again, to 300 x 1000 metres, and later also 450 x 1000 metres.

As a result the roads are spaced farther apart (2,000 metres) than in the previous polders (1,600 metres). Here, too, the land is first exploited for five years by the State and then granted out for about 65% on short-term lease, and the remainder on long-lease or freehold. The taking into cultivation proceeded from east to west, i.e. beginning with the higher and, therefore, drier ground. Fig. 25 gives a picture of the progress of reclamation and granting out of land in Eastern Flevoland.

In the initial plans the pattern of settlements is also highly reminiscent of the North East Polder. There were to be ten "A" centres, small villages with a service function for the surrounding agricultural area. In the middle of them there was to be a single "B" centre (Dronten) as a sub-regional centre, with a higher level of service provision. Since it was planned from the beginning to build a "C" centre in the north-west of the polder as a central place for the whole of the Zuyder Zee region, the sub-regional centre of Dronten was given a somewhat eccentric location.

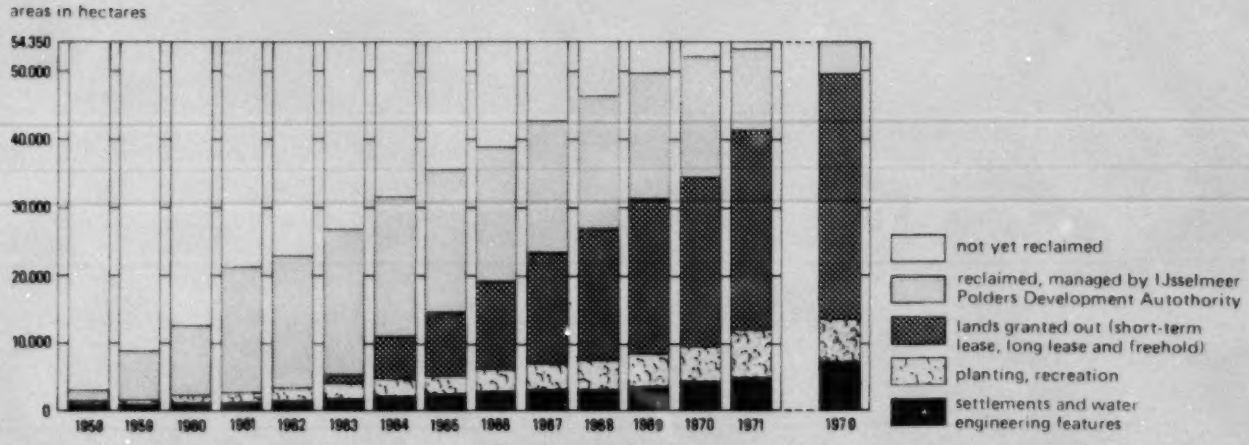


fig. 25 – Reclamation, allocation and zoning of lands in Eastern Flevoland.

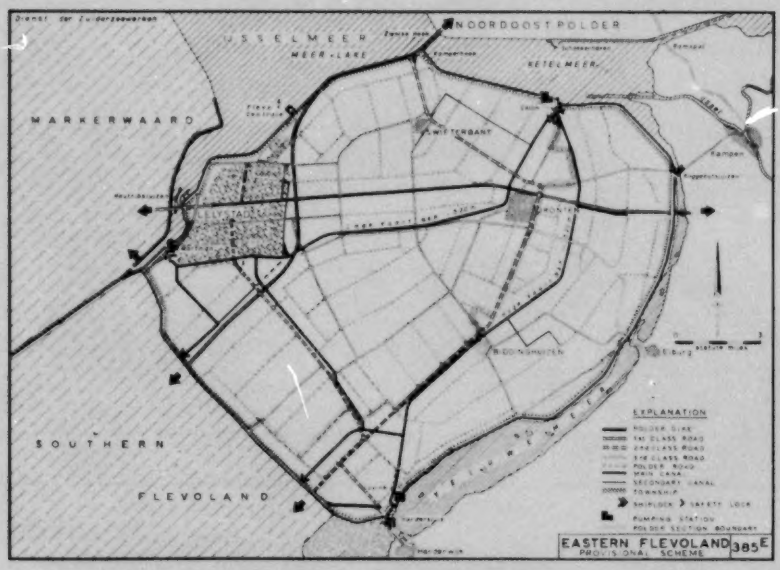


fig. 26 – Reference map of Eastern Flevoland.

It soon proved necessary for various reasons, however, to make radical changes to these plans. Firstly, the mechanisation of agriculture continued at such a fast rate that the number of jobs and, with it, the number of inhabitants, remained well below the estimates. Here too, as in the North East Polder, the viability of the ten villages was questionable, so that the number of "A" centres in the plans was gradually reduced during the years to two, i.e. Biddinghuizen and Swifterbant (see fig. 26).

As a guiding principle for determining the number of villages, *distances* (from farm to village and between villages, as applied in the North East Polder) were replaced by the *minimum size* needed to support a reasonable level of services.

Still more radical was the change in the overall concept of the use of the Southern IJsselmeer polders which became apparent in the early 1960's. At this time the central government came to the conclusion that the further growth of the "Randstad Holland" should be steered outwards and it soon became clear that the Southern IJsselmeer polders should also play an important part in this.

As a result, completely new and much more urban elements made their apperance in the planning. According to the plans of the early 1970's Lelystad would have to accommodate a population of 100,000 towards the end of the century. This implied a much more rapid growth than had so far been achieved in the regional service centres. Understandably, the planners were urged to great caution by these sudden changes. In the various plans, such as those contained in the "Structure Plan for the Southern IJsselmeer Polders" of 1961, the "Second Report on Physical Planning in the Netherlands" of 1966 and the "Third Report on Physical Planning in the Netherlands (1973-1978), therefore, a clear attempt has been made to produce an open, flexible plan for the lay-out of these polders, to which changes can still be made at any time.

In the "Urbanisation Report" (Part 2 of the 'Third Report', published in 1976) Lelystad – like Almere in Southern Flevoland – is designated as a 'growth centre', which means that at least 6,000 dwellings must be built within ten years. *)

Not only from the urban settlements is it apparent that Eastern Flevoland is fulfilling, more than the previous polders, a function in the physical planning of the whole country. It is also evident from the planning of the non-urban areas. Particularly along Lake Veluwe there are to be found recreational provisions, such as beaches, yacht harbours, woods and camping-sites, which are clearly in excess of regional needs.

*) Cf., for example, IDG Bulletin, 1979-80, pp. 25-26.

The landscape plan, which was limited in the two earlier polders to providing planting around farmsteads and villages, along roads and on land less suited to agriculture, is now beginning to occupy a much more important place.

In addtion, we find near Lelystad an electric power station, which also supplies current to a part of the "old land", and a 218 hectare complex of fishponds where young fry are raised principally for amateur fishing over the whole of the Netherlands, using the heated cooling water from the power station. The polder also contains, for purposes of scientific research, a 63 hectare ecological reserve and a 200 hectare field bird reserve. On 140 hectare along Lake Veluwe is situated a permanent exhibition of Dutch agriculture (Flevohof).

Lelystad

Of the four settlements, Lelystad obviously attracts the most attention in view of its future size – 100,000 population – and function (photograph XIII).
The task of building a medium-sized city in a relatively short time in an area which, around 1960, still consisted mainly of swampy reed-beds, seemed unreal. The following were among the principles on which the planning was based:

– creating a living climate in which the inhabitants would combine the advantages of life in a smaller settlement (house with a garden at a price or rent within people's means, recreational facilities within a short distance of the dwelling, few or no "environmental problems") with the advantages of life in a larger city (good communications, high level of services etc.).
A sociological survey carried out in 1977 by the IJsselmeer Polders Development Authority among 1,000 residents of Lelystad led to the conclusion that this aim had been largely achieved. Most of the people interviewed were well satisfied with "Life in Lelystad" (Leven in Lelystad" = title of the report).

photograph XIII – *The first stage of Lelystad, looking N. Right background, the Oostervaart industrial zone; left distance, the Flevo power station, with the ponds of the fish farm in front.*

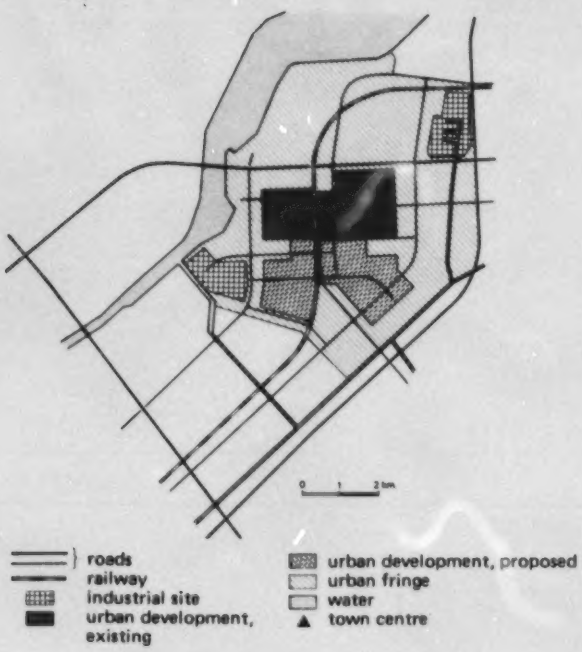


fig. 27 – Structure plan of Lelystad.

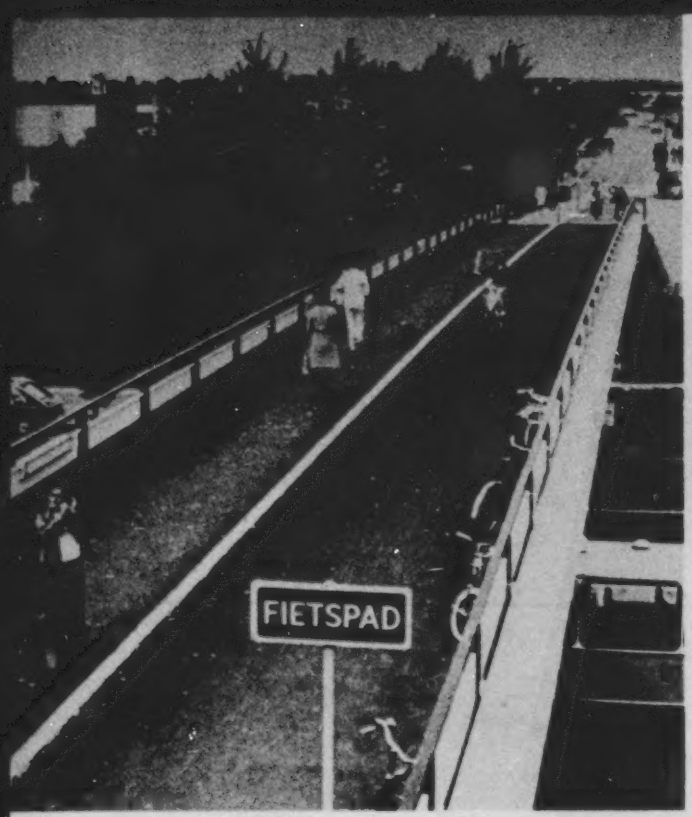
– building a city where the population can both live and work. This aim seemed to be succeeding more initially than it is at present. In the early years the majority of people settled in Lelystad because they worked there, e.g. in the offices of the Polders Development Authority or in the building industry and associated light industries. With the rapid growth of the city, the related enhancement of the level of services and the improvement of communications, there was a rapid increase in the number of people who came to live in Lelystad, but continued to work elsewhere (mainly in Amsterdam). It is hoped that this phenomenon will be of a transitory nature.

The government department concerned wit the planning, lay out and administration of the polders, a number of light industries and the previously mentioned electricity power station at present form the major employers for the economically active population.
The population is growing rapidly (population at 1st January 1981: 43,220; increase in 1980: 4,916). The figures show increasingly clearly that Lelystad is fulfilling its task as a reception town for the population overspill from the Amsterdam agglomeration. During the period 1967-1971, 12% of the new inhabitants of Lelystad came from the agglomeration of Amsterdam; in 1980 this proportion was 49.4% [1]. The growth of employment in Lelystad is lagging behind the population growth. As has already been remarked, many people continue to work in Amsterdam and travel to and fro daily by car or bus. This is having an unfavourable influence on the ratio of economically active population to employment (see the figures below). Also remarkable is the considerable inward commuting, mainly of workers in the building industry (who are now incidentally quickly decreasing as a proportion of the total number of workers).

Employment and commuting in Lelystad *)	1972	1974	1980
living and working in Lelystad	2314	3180	7107
inward commuting	2184	1855	3330
vacant jobs	64	175	180
total jobs in Lelystad	4562	5210	10617
outward commuting	270	1375	6306
unemployed	48	89	942
living and working in Lelystad as % of the economically active population	88	74	50

*) Source: "Cultuurrijp", IJsselmeer Polder Development Authority/Municipality of Lelystad.

A striking feature of the plan for Lelystad is the principle of phased construction, which makes it possible to call a halt to further expansion without the city creating an impression of being incomplete.



photograph XIV – *One of the bridges for cyclists and pedestrians with, in the background, houses in the first neighbourhood of Lelystad.*

photograph XV – *Traffic-free shopping centre of Lelystad, with the offices of the IJsselmeer Polders Development Authority in the background.*

Moreover, during the early years the inhabitants do not have too much the feeling of living in an uncompleted pioneer zone (see fig. 27).

The town has been planned in the form of four neighbourhoods situated around an elongated central area and each divided into sub-neighbourhoods of 5 to 6,000 inhabitants. The density in the residential neighbourhoods is low, generally not exceeding 30 dwellings per hectare. After the building of the first relatively rectilinear and uniform neighbourhood, the more recent neighbourhoods show more variation and imagination, both in dwelling types and street plan (fig. 28).

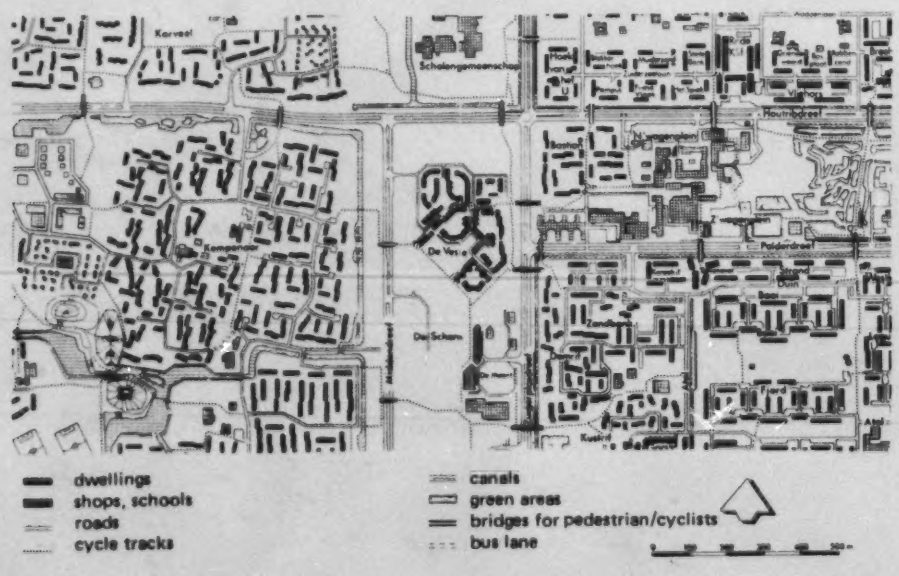
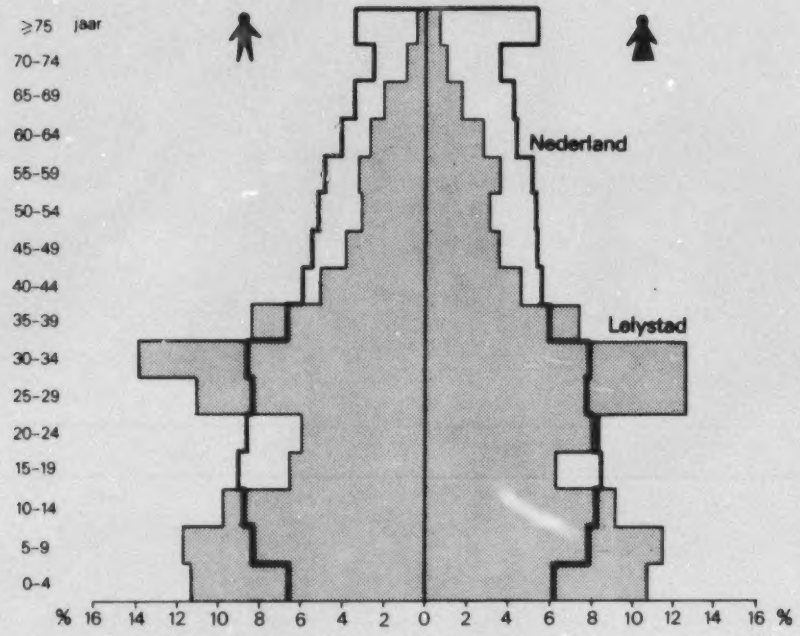


Fig. 28 – Detail of the development at Lelystad. In the middle, the city centre under construction with, right, part of the first and, left, part of the second residential neighbourhood.



Population pyramid Lelystad/Nederland

fig. 29 – Population pyramid for Lelystad/Netherlands, 1-1-1980.

The first dwellings were handed over in 1967. Fig. 28 shows a part of the already completed sector of Lelystad. The whole of the city is being built according to the principle of traffic segregation. The districts are separated from each other by main traffic roads at a somewhat lower level. The inhabitants can cross these dividing elements by means of bridges for pedestrians and cyclists (photograph XIV, p. 38 and photograph XX, p. 51).

Within the residential areas the blocks of dwellings are grouped along narrow streets and small squares, where there is little or no traffic. These streets open on to collecting streets, which connect at various points with the urban roads. 80% of the dwellings are single family houses. In order to give Lelystad a more urban aspect from the beginning, a three storey dwelling type with a flat roof was chosen for the first phase.

On 1st January 1981 Lelystad had 43,220 inhabitants. Fig. 30 gives a picture of the age structure of the population of Lelystad on 1st January 1980, compared with the population pyramid for the whole of the Netherlands. A striking feature (and characteristic of a "pioneer population" as can be expected here) is the predominance of the group of young adults (25 - 35 years) and of young children (0 -10 years), as compared with the weak representation of older youth (15 - 25) and of the elderly. Obviously, the birthrate is higher here and the deathrate lower than the Netherlands average (see the statistics in the Appendix, p. 66).

On 1st January 1980, thirteen years after the first inhabitants had settled there, Lelystad became an independent municipality. Up to that time local administration was carried out by the IJsselmeer Polders Development Authority and the Southern IJsselmeer Polders Board. The new municipality covers the western half of the polder of Flevoland, giving a combined area of 270 km2.

Dronten

The "B" centre of Dronten had a population of 11,370 on 1st January 1981. The town plan is characterised by a large, traffic-free central square, surrounded by shops and a striking community centre, the "Meerpaal", a large hall containing a theatre, a café and restaurant and conference rooms grouped around a central open area, which can be used for sports contests, the weekly market or mass meetings (photograph XXII, p. 54). Around the central square are grouped the residential areas, the industrial estate and the open spaces for sport and recreation.

In the administrative sphere a somewhat different course has been followed from that in the two earlier polders. The area does not belong to a neighbouring province, but comes directly under the jurisdiction of the Ministry of Home Affairs. It is still not clear whether the three southern Lake IJssel polders (Eastern and Southern Flevoland, and the Markerwaard, if reclaimed) will form a new province in the future. This depends partly on the decision about the reclamation of the Markerwaard (cf. Chapter IX) and the realisation of the plans for a reorganisation of the provinces of the Netherlands (cf. IDG Bulletin, 1979-80, p. 48).

The municipality of Dronten, which covers the eastern half of Eastern Flevoland, including the villages of Biddinghuizen and Swifterbant, was created in 1972.

Chapter VII – Southern Flevoland

Planning

In passing from Eastern to Southern Flevoland we have arrived at the border between what is largely existing reality and the plans which have either not yet been wholly carried out or have not yet even been agreed.

In Southern Flevoland, which fell dry in 1968, the first farms were leased out in the southern section at the end of 1978. On 1st January 1981 91 farmers had holdings there, covering a total area of 4500 hectares. A large part of the polder is still being farmed extensively by the IJsselmeer Polders Development Authority. In other parts wild life and recreational areas have been or are being laid out, while in the south-west corner the new city of Almere is being rapidly developed.

The shift from a mainly agricultural use to other functions (urban residential function, industry, open air recreation, nature conservation) which fit into the physical planning of the whole country, a shift which was already noted in Eastern Flevoland, is still more apparent in this polder. About half of the land will ultimately be used for non-agricultural purposes (fig. 30).

Almere, like Lelystad, designated as a growth centre in the Urbanisation Report of 1977, will ultimately have between 125,000 and 250,000 inhabitants.

A marked example of the flexibility of the plans is given by the strip in the north of the polder along the Oostvaardersdiep. In the original plans large areas were zoned for industrial purposes. In the past ten years, however, an area of natural swampland has spontaneously developed, which is of great value particularly for the many bird species which occur there. Even birds which had disappeared from the Netherlands at the beginning of the century, such as eagles and greylag geese, are again to be found. Now that the stagnation in economic growth has led to a great reduction in the demand for industrial sites, this wildlife area of the Oostvaarders Lakes has come to form an indispensable element in the physical planning of Southern Flevoland.

In the central part of the polder there will be agricultural holdings, with standard parcels of 500 x 1200 metres = 60 hectares, three times as large as in the first polder, the Wieringermeer (see fig. 19, p. 22).
Different areas, which may be used in the future for residence, industry or recreation, are initially used for agriculture.

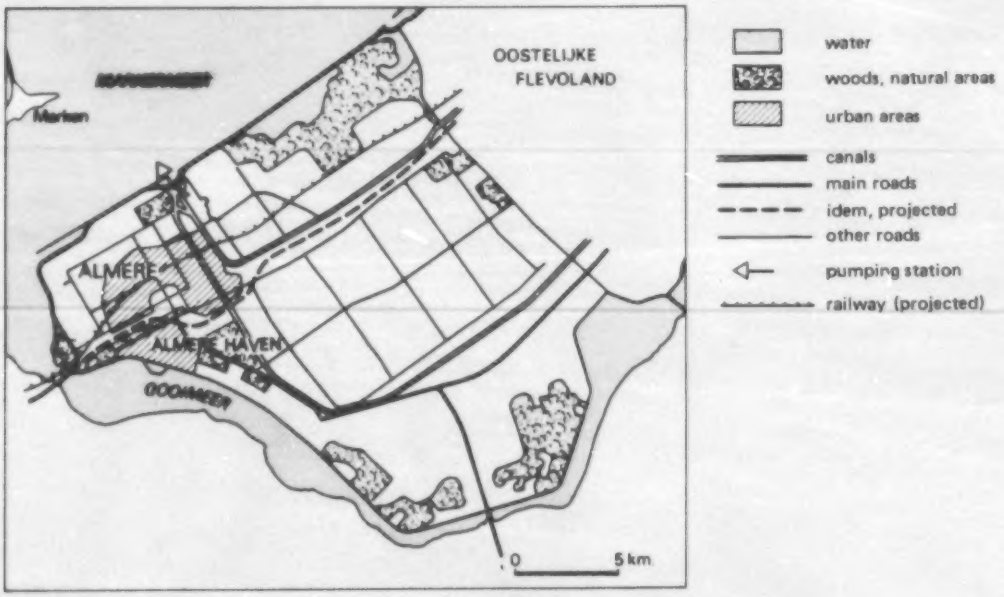


fig. 30 – Reference map of Southern Flevoland.

Settlements

As far as the planning of settlements is concerned, the hierarchical principle of A, B and C centres has been abandoned in Southern Flevoland. Besides the city of Almere, which is an overspill town for the Randstad, only the settlement of Zeewolde will be built in the south-east of the polder. This place will serve as a service centre for the agricultural areas and also possess a function as a recreational centre, by virtue of its position in the vicinity of woods and a marginal lake. Smaller villages – "A centres" will not be built at all in this polder.

Almere has an even more flexible structure than Lelystad. The city will consist of several, more or less separated nuclei (fig. 31). A number of urban concentrations has been conceived for Almere, the largest of them located along the railway from Amsterdam via Almere to Lelystad. They are separated by green areas, used mainly for recreation. In this it is hoped to achieve as many aims as possible, including:

- variation in living conditions.
  In addition to some flats in the centre, mainly single family homes will be built to meet the wishes of the population, partly to compensate for the high proportion of flats in the bordering parts of the "old land".
- accessibility.
  Many dwellings at a short distance from halts on the railway or from stopping places on other public transport links.
- flexibility.
  The concept of a number of nuclei, separated by green spaces, affords many possibilities for the plans to be adapted to changing circumstances and planning philosophies.

photograph XVI – *Almere-Haven under construction, looking S.; in the background, Lake Gooi and the town of Huizen on the 'old land'.*

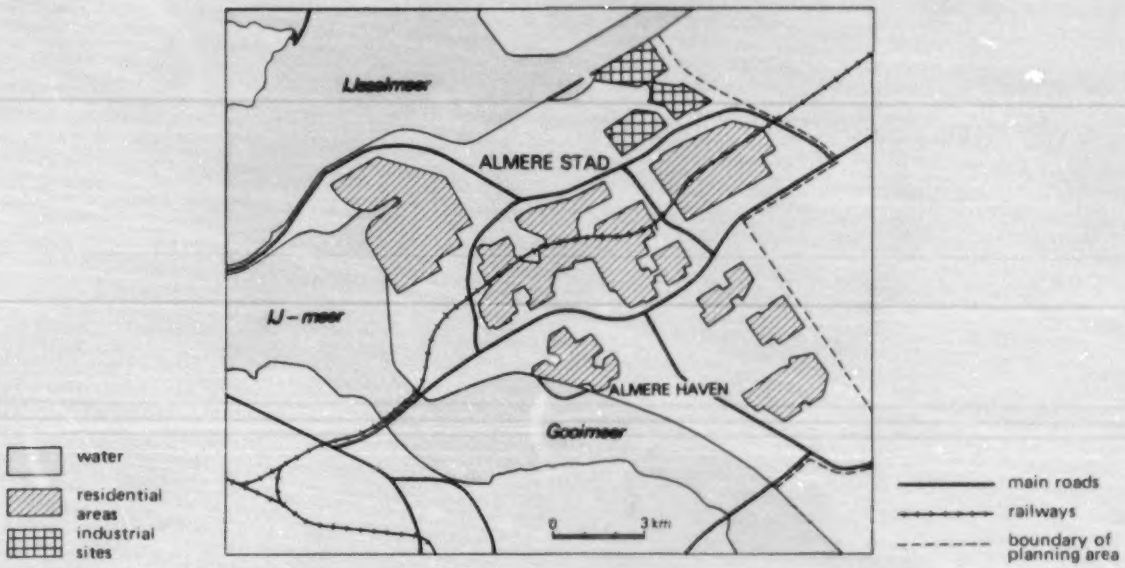


fig. 31 – Structure plan of Almere.

– interrelationship with green spaces (recreation).
The building of a number of nuclei instead of a single large city will enable a relatively large number of people to live near the open areas.

There has clearly been an attempt to achieve a compromise, in which the advantages of dispersed development, to meet the needs of recreation and the environment and the wishes of the population, are not achieved at the expense of the advantages of a compact urban structure (high level of service provision, good access to facilities, potential for public transport).

In 1975 a start was made on the building of the first nucleus, *Almere-Haven,* situated on Lake Gooi. At the end of 1976 the first residents moved into their houses there. The population on 1st January 1981 was 12,213.

At the end of 1978 a start was made on the construction of the second nucleus, *Almere-Stad.* This nucleus is planned to house a population of 90,000 and to provide 35,000 jobs. A further two or three nuclei will follow and these will be completed towards the end of the century.

In the centre of Almere-Haven town planning and architectural principles have been applied which are strongly influenced by traditional Dutch town planning forms. As a result a townscape has been created which differs greatly, for example, from that in the first section of Lelystad built about fifteen years ago (photograph XXI, p. 53).

Some 70% of the inhabitants of Almere-Haven come from the agglomeration of Amsterdam. It is particularly the more attractive living climate – "a house with a little garden" – which is appreciated by them. 75% of the economically active population of Almere-Haven still works outside Almere, largely in Amsterdam.
There is great interest in both homes and industrial and commercial floor space in Almere and there are long waiting lists for home seekers.

On 1st January 1981, 90 firms were established on the four industrial sites. Most of them fall into the categories of light industry, wholesaling and offices.

A segregated traffic system is also applied in Almere. The difference with Lelystad is that the connections between the different sections of the city, which cross over or under the busy motorways, are intended not only for cyclists and pedestrians, but also for public transport (bus).

Often in the building of new towns there is a long delay in the provision of the necessary facilities. It is clear that an effort is being made to avoid this in Almere. At the celebration of the second anniversary of Almere-Haven the inhabitants already had the use of a shopping centre, a post office, a library, a café and restaurant, a sports centre, a covered swimming bath, sports grounds, tennis courts and regular bus services.

Chapter IX – Markerwaard

Marken

This polder has been named after the island of Marken, that was already linked to the mainland in 1957 by a dam about 2 kilometres long. This brought about radical changes. A large part of the population (some 2000 people), which previously depended upon fishing and seafaring, sought work on the mainland. In addition, tourism is an important source of income.

Discussion

As has already been indicated in Chapter IV, there has now been a lively discussion in the Netherlands for several years on the question of whether it is desirable and justified to carry out the original plan for this final polder.
It was originally planned that, after the completion of Eastern Flevoland, the Markerwaard would first be developed and only then Southern Flevoland. On planning and financial grounds it was decided in 1959 to reverse this order, but before Southern Flevoland fell dry in 1968, a discussion had arisen in the Netherlands about whether there was still any merit in reclaiming the final Lake IJssel polder and whether the disadvantages did not outweigh the advantages. At the end of the 1960's and during the 1970's this led to the carrying out of a large number of studies and to the publication of various reports, both official and private.

photograph XVII – *The dike from Lelystad to Enkhuizen, looking N.E. In the foreground, the discharge sluices and shipping locks near Lelystad (the Houtrib Locks). Left of the dike, Lake Marken, the part of Lake IJssel from which the Markerwaard would be reclaimed.*

These include:

- the report "Beschouwingen over de Markerwaard" (Reflections on the Markerwaard; 1972) of the Zuyder Zee Project Department, which contains six alternatives for impoldering, ranging from no reclamation to a polder of 50,000 hectares (the original plan for a 60,000 hectare polder with almost no marginal lakes had been abandoned in any event);
- the "Waterlely" (Water lily) report of 1974, published by the Association for the Preservation of Lake IJssel, which was set up by a group of concerned citizens in 1972. This recommended abandoning reclamation, partly in the interests of nature and water sports;
- the report "Verkenningen Markerwaard" (Reconnaissances in the Markerwaard ; 1975) by the IJsselmeer Polder Development Authority and the Zuyder Zee Project Department, which is concerned mainly with the possibilities for the planning of the new polder;
- the Advisory Report of the Council of Water Affairs in the matter of the Markerwaard, entitled "De Markerwaard 't maken waard?" (Is it worth making the Markerwaard?; 1976).

The latter report, based on the reports listed above, as well as many others, proceeds from the assumption that it is worthwhile to reclaim the Markerwaard. It had meanwhile been decided to subject the decision making about the Markerwaard to the Key Planning Decision public participation procedure (on this see, for example, IDG Bulletin, 1979-80, pp. 18-19). Within the framework of this procedure the Ministers of Transport and Water Affairs and of Housing and Physical Planning submitted to Parliament on 5th December 1980 the Government's policy proposals for the Markerwaard, entitled "The Development of the Area of the Markerwaard".

In this report the Government states that all aspects relating to a possible impoldering have been sufficiently studied and that further postponement of a decision therefore has no point. On the basis of the Advisory Report of the Council for Water Affairs it is proposed to proceed to the reclamation of a Markerwaard covering 41,000 hectares. This proposal is based on a solution which will permit the maximum advantage to be gained from the impoldering, while keeping the disadvantages to a minimum.

The most important advantages mentioned in the report are the following:

- reclamation of high quality agricultural land, which may be regarded as an important compensation for the agricultural land lost elsewhere in the Netherlands as a result of urban growth, road building etc.;
- the creation of new possibilities for urbanisation policy and for special uses such as a second national airport or a large military training ground;
- the creation of new possibilities for small-scale water sport and for shorebased recreation;
- the creation of new nature reserves and of possibilities for forestry.

The report gives the following as some of the disadvantages:

- reduction of the natural fresh water area;
- reduction of the possibilities for water sports with sea-going boats;
- reduction of the area of the fishing grounds and therefore decline of the fishing industry;
- the fact that certain important waterfowl will probably decrease in number.

Other people, such as the spokesmen of the Association for the Preservation of Lake IJssel, add such points as the fact that agriculture in Western Europe is having to contend with over-production, that the area of new agricultural land will compensate for the loss of farmland on the old land for only a few years, that according to principles recently set out in the urbanisation policy (Urbanisation Report, Part 2E) further urban growth should take place in and close to the existing city regions rather than at greater distances from them (partly in order to reduce mobility), and that, since the fuel crisis of 1973, it is doubtful whether the Netherlands will ever require a second national airport.
It is also said that the demand for new dwellings will fall with the reduction in the rate of population growth. On the other hand, the report points out that, as a result of the redevelopment of old city centres etc., which always results in a continuing reduction of average dwelling occupancy, the building of large numbers of new dwellings will be necessary until well into the 21st century.

Obviously the factor of *costs* also plays an important part in these discussions. While it is already no simple matter to calculate the precise costs of reclamation and ancillary works, it is almost impossible to make a reliable estimate of the benefits. The stumbling blocks here are such items as environment, nature conservation and recreation, which are particularly difficult to quantify.

The total costs of embanking, pumping, reclaiming and initial lay out of the Markerwaard are put at 1250 million guilders (at 1980 prices). This is based on the most simple form of lay-out, i.e. for purely agricultural purposes.

According to the report, the estimates of the benefits lead "to the cautious conclusion that the economic aspect, in any event, does not appear to produce any weighty argument against reclamation". An additional point is that reclamation and the later use and management of the polder would have a favourable effect on employment. For the primary works alone, as described above, 27,000 man years would be needed.

If, as a result of the public participation procedure, it is decided to go ahead with impoldering, this could not be begun before 1982 at the earliest. The polder would fall dray at the end of the 1980's after which the lay out could begin. The Markerwaard could therefore certainly not come into partial use before 1995.

If it were decided not to proceed with impoldering, the already completed dike from Enkhuizen to Lelystad need not be regarded as superfluous. Apart from providing a shorter traffic link with the northern part of the province of North Holland it also serves an important function in the water economy, since it forms a division between the marginal lakes and Lake Marken, on the one hand, and the remainder of Lake IJssel on the other. This is of benefit particularly to the water quality of the latter (cf. p. 18).

B – EXCURSION ROUTES

Introduction

In indicating excursion routes one is faced with the following difficulties, among others. The specific fields of interest may be of a widely differing nature, such as the water engineering aspects, agriculture, settlements. The routes to be recommended are also greatly dependent upon the amount of time available. In order to meet both difficulties as far as possible, routes have been planned which include as many different aspects of the project as possible.

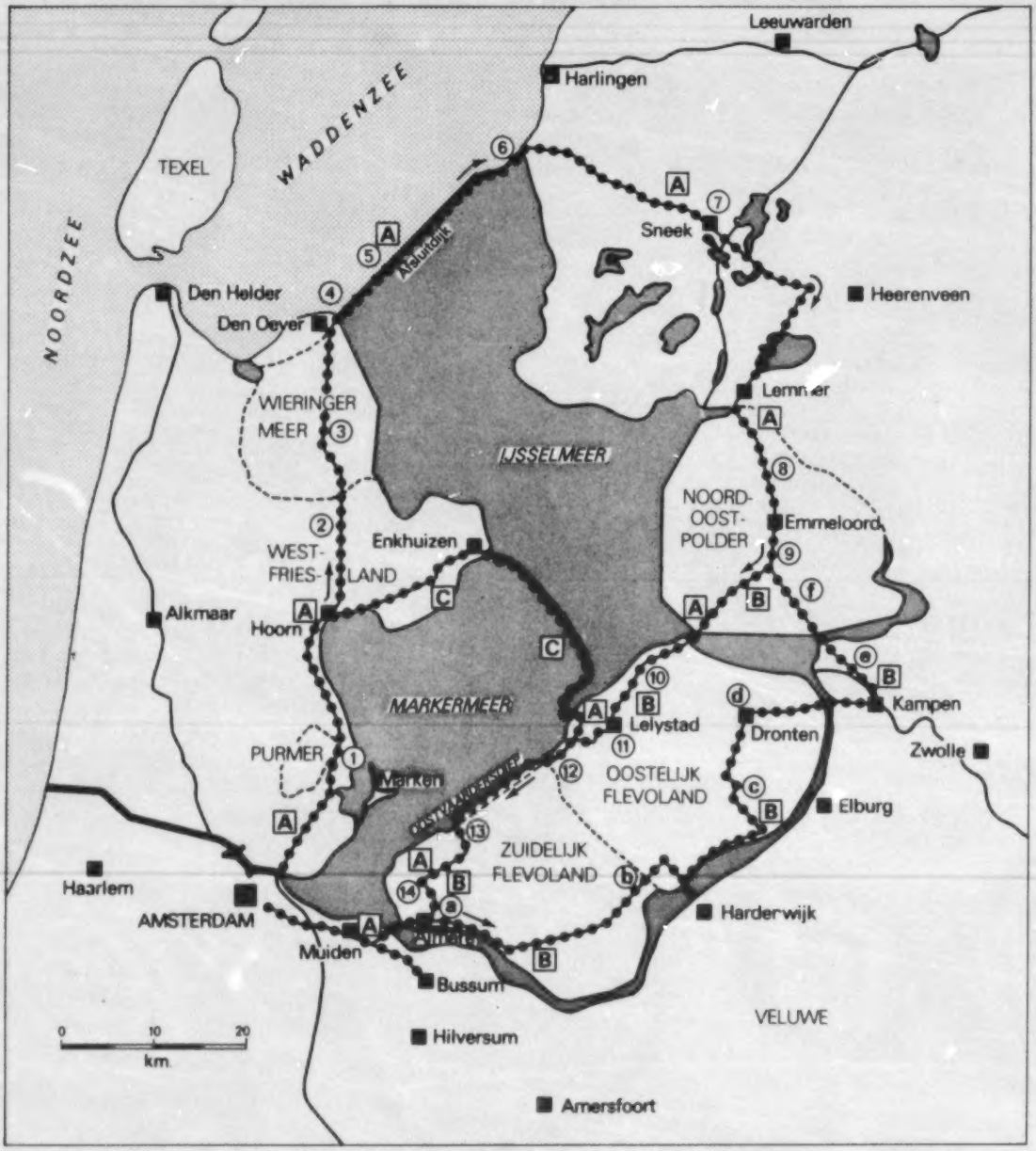


fig. 32 – Summary map of main excursion routes.

Those people who have only one day available have a choice between three main routes which give the best possible overall view in the given circumstances. In addition, three detailed routes have been chosen to assist closer study of particular areas, allow visits to museums etc. With the aid of a good map (see Appendix 6, p. 70), the visitor can work out a route for himself from among these alternatives. Application for farm visits can be made to *Rijksdienst IJsselmeer polders, Afdeling Voorlichting* (Information Division), Zuiderwagenplein 2, 8224 AD Lelystad, tel: (0)3200 - 99111.

Lastly, it should be noted that changes may have occurred in the road network and in signposting since the publication of this guide, especially in Southern Flevoland in and around Almere.

Main Routes (fig. 32, p. 47)

A – Amsterdam - Hoorn - Wieringermeer - Afsluitdijk - Sneek - Lemmer - Emmeloord - Lelystad - Muiden.
B – Amsterdam - Muiden - Dronten - Kampen - Emmeloord - Lelystad - Muiden.
C – The road which was opened in 1976 along the dike from Enkhuizen to Lelystad provides the possibility of a link between routes A and B.

Main Route A

Map: Motoring Maps of "Noord - en - Midden - Nederland", scale 1 : 200,000, published by A.N.W.B.

This route is the longest, but also provides the most complete picture of the Zuyder Zee project.

This is not only because it includes the Afsluitdijk (barrier dam), but also because it passes through all the polders in the sequence in which they were drained. As a result, the visitor obtains a good overview of the various stages of development, from the half-century old landscape of the Wieringermeer polder to the still partly undeveloped polder of Southern Flevoland.

From Amsterdam follow the E10 main road in the direction of Leeuwarden.

1 – A few kilometres beyond Monnickendam the road follows the ring canal of the Purmer, one of the lakes reclaimed in the 17th century with the aid of windmills (cf. figs. 3 and 4 on p. 7). These drainage schemes were an investment for the wealthy Amsterdam merchants and their purpose was to ensure the city's food supply (bread grains). The lakes had been created as a result of digging away the peat for fuel to well below the groundwater table.
Note the difference between the landscape of this drained lake on the left (3 to 4 metres below sea level, partly used for arable farming) and the older landscape on the right (ca. 1 metre below sea level, more irregular parcels, exclusively pasture).

photograph XVIII – *Western end of the Barrier Dam, looking N.E. – left, the Wadden Sea, right, Lake IJssel – with three blocks each of five discharge sluices (Stevin sluices) and, in front, the passage for shipping; the locks are to the right, of the picture. On the far left, the fishing port of Den Oever on the former island of Wieringen.*

Past Edam the road passes through a very well-watered area of peat, which suffered regularly from flooding before the damming of the Zuyder Zee (as did, for example, Waterland, the area immediately north-east of Amsterdam).

2 – Beyond Hoorn the road traverses the part of the province of North Holland known as West Friesland. This area is less low-lying than we have just passed through, the soil consists of marine clay and a striking feature of the land use, apart from the livestock grazing, is the wide occurence of market gardening.

3 – Some 10 kilometres beyond Hoorn the road crosses the former sea-dike (under a viaduct) and enters the Wieringermeer Polder lying at a few metres lower elevation. This polder fell dry in 1930 (see description in Chapter V). The landscape of the Zuyder Zee polder is immediately recognisable: rectangular parcels, uniform farm buildings, large arable parcels. Especially after the road has made a slight bend to the left after about 3 kilometres, the pattern of parcels described in Chapter V is clearly discernible (fig. 22, p. 27).
Past the settlements of Middenmeer and Wieringerwerf – particularly at the latter place it is worth the small inconvenience of leaving the main road for a short time in order to take a short drive through the village -- the road leads to the woodland planted on sandy soil at the northern apex of the polder. At the end of this stretch is the Leemans pumping station.

4 – The Afsluitdijk (barrier dam) is reached via the eastern extremity of the former island of Wieringen (photograph XVIII). At the beginning of the dam the statue of Lely is seen to the left. Immediately at the beginning of the dam one sees to the right the shipping locks and, to the left, the lifting towers of the 15 discharge sluices.
These discharge sluices, together with the complex at the other end of the Barrier Dam, make it possible to regulate the water level of Lake IJssel closely. The lake receives river water (mainly from the River IJssel and Zwarte Water), precipitation and water pumped from the surrounding polders. The amount of this water which is discharged into the Wadden Sea at low tide is such as to bring the level of Lake IJssel to 20 cm. below mean sea level in summer and 40 cm. below in winter.

photograph XIX – *Market on De Deel in Emmeloord. Left, the polder tower (water-tower with carillon); right government offices (all since completed); immediate foreground, entrance to the theatre.*

5 – After some 6 kilometres of the dam have been traversed the monument is seen rising up to the right at the spot where the last gap was closed in 1932. It consists of a look-out tower with a souvenir shop and cafetaria. On the front it bears the inscription "hier werd de dijk gesloten - 28 mei 1932" (here the dike was closed - 28th May 1932). On the other side is a relief representing the dike-builders and with the text "Een volk dat leeft, bouwt aan zijn toekomst" (A living nation builds for its future).

6 – At the eastern end of the dam are passed the 10 discharge sluices on the left and the double shipping lock on the right. Immediately after leaving the dam, the massive Frisian sea-dike is seen to the left, raised and reinforced to compensate for the damming of the Zuyder Zee.

7 – The road passes through the pastoral landscape and lake district of Friesland via Bolsward, Sneek, Joure and Lemmer to the North East Polder. The Frisian lake district is particularly important for water sports. The peat pools have not been drained here as they were in North Holland. Among the reasons is the fact that this part of the country is less densely populated, the pools were indispensable for the storage of surplus polder water in this low-lying part of the province of Friesland, and the bottom of these lakes consists not of clay, but of sand.

8 – The road enters the North East Polder near Lemmer (see also the description in Chapter VI). The landscape of this 40 years old polder is reminiscent in many ways of that of the Wieringermeer Polder. One scarcely notices that the standard parcels are 50 metres wider. What are conspicuous are the large prefabricated barns near the farmhouses (see pp. 31/32) and the rows of two, three or four little houses in the neighbourhood of many farms. These were originally intended for farmworkers and their families, but because of the greatly increased mechanisation, they now often have another use.
The road leads past the Kuinderbos (wood, left) and the village of Bant (right), one of those villages where the population has not reached 700, to Emmeloord (see also pp. 32/33).

9 – By following the "Centrum" signs one reaches the central square, "De Deel", with its tall polder tower. (photograph XIX). An ascent of the latter is recommended and can be arranged in advance with the Tourist Office V.V.V., Lange Nering, Emmeloord, tel: (0)5270 - 2000. From the top there is an exciting view over the whole town (centre, residential areas, open spaces, industrial zones) and its surroundings. Grouped around the square are various public buildings, such as the Lands Office, Exchange/Theatre and bus station, and a market is held in the square on Thursday mornings.
The main shopping street, the Lange Nering, begins at the corner of the square by the theatre. It was built originally as a conventional shopping street, but has now been a traffic-free pedestrian area for some time. It also contains the Tourist Office (V.V.V.), from where plans of Emmeloord and the ten surrounding villages can be obtained.

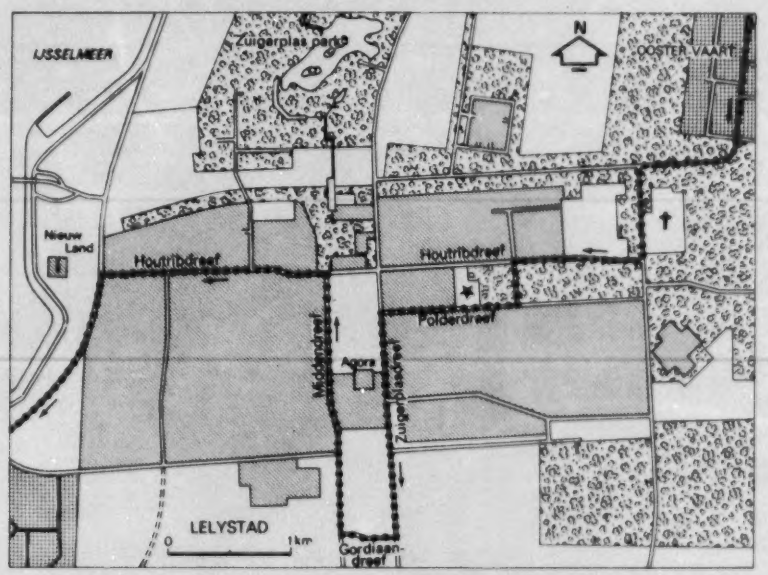


fig. 33 – Lelystad Route.

residential area
industrial site
parks etc.
water

As far as housing is concerned, it is noteworthy that, despite experiments in many spheres in the new polders, the houses differ little or not at all from those in new neighbourhoods elsewhere in the Netherlands (apart from one experimental neighbourhood in the south-west of Emmeloord).

10 – After leaving Emmeloord follow the signs to Lelystad. The double-carriageway road (A6) forming part of the new links between Amsterdam and the north-east Netherlands is soon reached (see fig. 18, p. 20). The North East Polder is left by way of the Ketel Bridge, from where there is a fine view. To the right the old fishing village of Urk can be seen at the end of the absolutely straight polder dike. Under the bridge flow the waters of the IJssel and Zwarte Water into Lake IJssel. These rivers receive the discharge of a large part of the drainage of the North and East Netherlands. Arriving in Eastern Flevoland, the road runs along the foot of the polder dike, passing close to the Flevo power station and the fish farm (see p. 36), to Lelystad.
The landscape of Eastern Flevoland is more open than that of the North East Polder, with its well-grown trees. It is also striking that the barns here are much lower than in the North East Polder. This is because of changes in the nature of the farming. There are less grain, flax and hay to be stored, but more potatoes, which are not stacked so high. Also absent here are the farm workers 'dwellings near the farms, as described in the North East Polder.

11 – Lelystad
After passing the fish farm turn immediately left (towards Swifterbant and Kampen), then right after a few hundred metres. The road then crosses the first industrial zone of Lelystad, known as Oostervaart, which is served by inland waterways as well as by road (fig. 33). After the road bends to the right on leaving the industrial zone, after about 500 metres take the first road to the left (direction "Centrum", past the crematorium, cemetery and sports grounds) and then, after another 500 metres, the road to the right (Houtribdreef). This is one of the town roads, crossed by bridges for pedestrians and cyclists (segregated traffic system, see p. 39). After about a kilometre the residential areas of the first stage of Lelystad are seen to the right; the route, shown on fig. 33, here turns left at the intersection (Parkdreef) and right at the next intersection (Polderdreef).

***photograph XX** – Centre of the first neighbourhood in Lelystad, looking E. with, in the centre, the building of the IJsselmeer Polders Development Authority and, left of it, the partly covered shopping centre. Left, the Houtribdreef, right, the Polderdreef, spanned by the bridges for cyclists and pedestrians.*

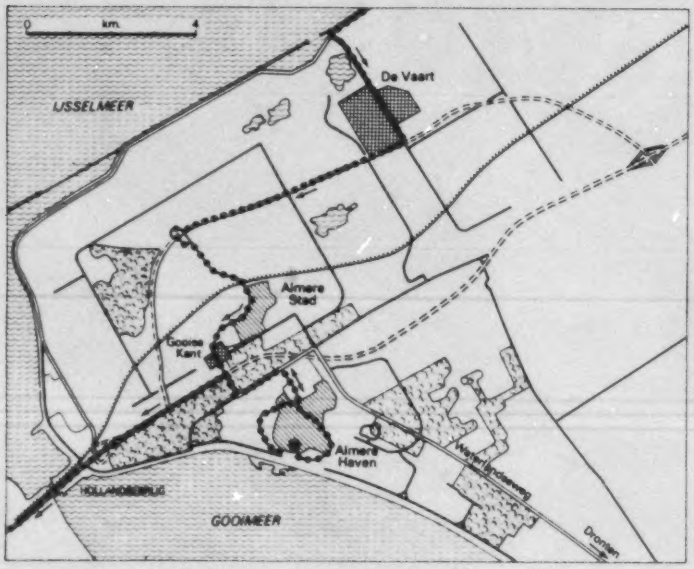


fig. 34 – Almere Route.

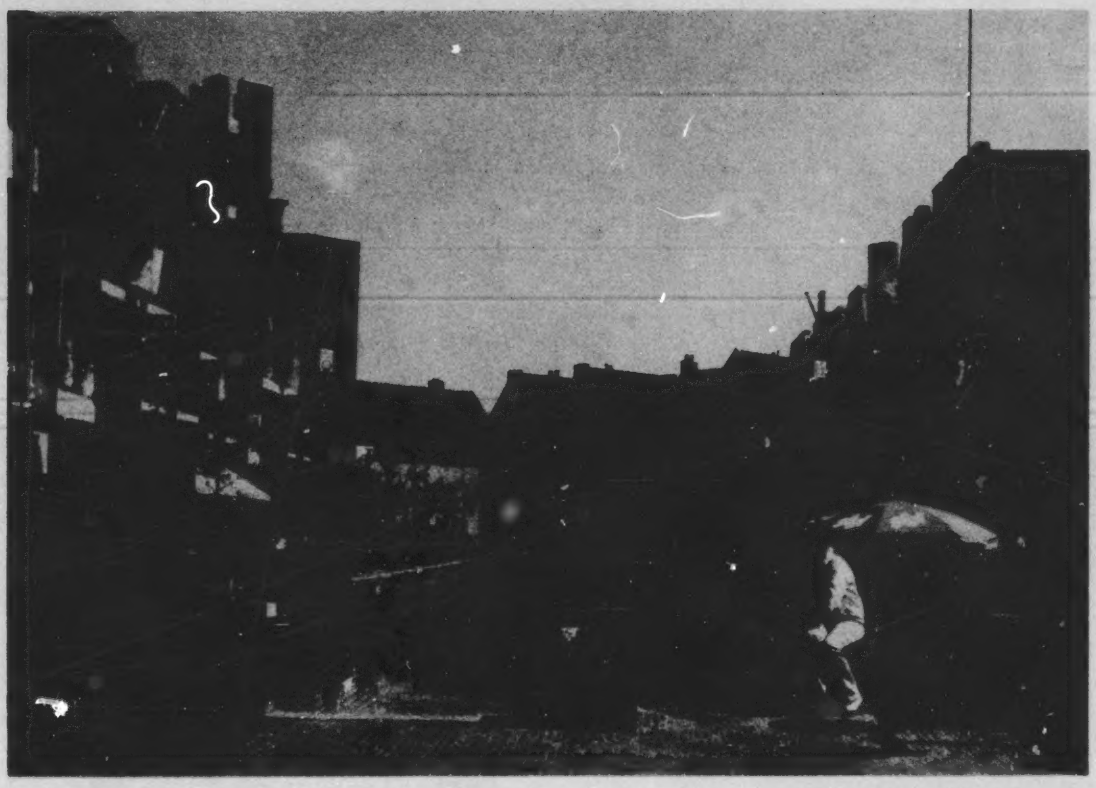
roads
roads under construction
projected Flevo railway
centre of Almere-Haven
water
woodland
built-up area
industrial site

It now passes the buildings of the IJsselmeer Polders Development Authority and the Zuyder Zee Project Department (photograph XX). In the latter building, known as the "Stadskantoor", town plans of Lelystad are obtainable (* on fig. 33).
At the end turn left (Zuigerplasdreef, going towards Harderwijk) past the area where the centre of Lelystad is being developed. Here is to be seen the 'Agora' community centre, which accommodates a theatre, a swimming pool, a library a sports centre and a restaurant. Close by are to be found a hotel and a shopping centre. In the near future the station on the Zuyder Zee railway will also be opened in this central area.
After about 1800 metres turn right (Gordiaandreef), past the hospital and, at the next major road (Middendreef), turn right again. Here on the left is the second residential neighbourhood of Lelystad, which has a more playful lay-out and greater variety of dwelling types.
After two kilometres the route turns left (Houtribdreef) out of the town.
In comparing Lelystad with Emmeloord, it is striking that Lelystad not only makes a more metropolitan impression, but that a greater effort has been made than in Emmeloord to find new forms and solutions in such fields as housing types and traffic planning.

12 – At the end of the Houtribdreef the route turns left in the direction of Amsterdam, following the dike along the Oostvaardersdiep. *) After about 2 1/2 km. one of the three pumping stations of Eastern Flevoland, the Wortman, is passed. After a further 1 1/2 km. the Knardijk is passed on the left, with signposts to Harderwijk. This dike forms the division between Eastern and Southern Flevoland.

13 – The route follows the dike along the future Oostvaardersdiep, passing through the wildlife area of the Oostvaarders Lakes (cf. p. 41).
As soon as the road bends to the left shortly before the "De Blocq van Kuffeler" pumping station, take the first turning left leading to the "De Vaart" industrial estate (fig. 34). This is one of the industrial zones of the city of Almere. South west of this site the central nucleus of Almere-Stad is under construction.
By continuing to follow the signs for Almere and then Almere-Haven, you pass the first residential neighbourhood of Almere-Stad and then the "Gooise Kant" industrial estate to enter Almere-Haven.

*) those wishing to visit the "Nieuw Land" Information Centre are referred to Detailed Route 3, para. 1, p. 63.



photograph XXI – *Canal in the centre of Almere-Haven. In most of the premises there are shops on the ground floor and dwellings over.*

14 – Whether or not visiting the centre of Almere-Haven, which is interesting, among other things, for the town planning and architectural contrasts with Lelystad, follow the signs for Amsterdam to leave the polder by the Holland Birdge. The bridge for the Zuyder Zee railway is being built immediately to the west of the road bridge.

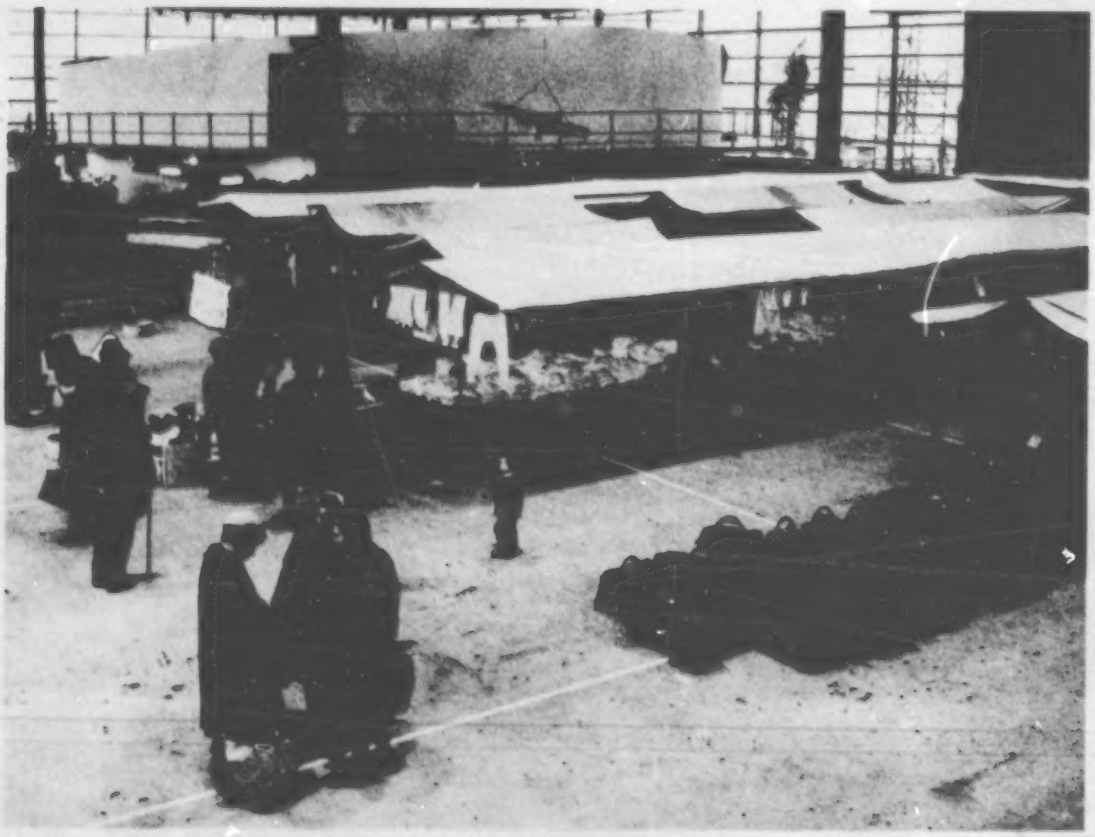
Route B

Map: Motoring Map – Midden-Nederland, scale 1 : 200,000, published by A.N.W.B.

This route is also intended to give, in a brief space of time, a total impression of the Zuyder Zee project, and here again the different stages of development can be clearly observed in the successive polders. Although the Afsluitdijk is omitted from this route, this makes the route that much shorter so that it can be followed at a considerably more restful tempo (cf. fig. 32, p. 47).

a – Leaving Rijksweg (National Road) 1 and passing through Muiderberg (follow Lelystad signs), cross the peripheral lake between the Gooi and Southern Flevoland by way of the Holland Bridge. Once over the bridge turn right to reach the area of the city of Almere.
If desired, a short tour of Almere-Haven may be made at this point (see fig. 34, p. 52), after which follow the Waterlandse Weg in the direction of Dronten. This road passes through the part of Southern Flevoland where, because it had the shallowest depth below sea level, reclamation began. Particularly to the right of the road there are areas where woods have been planted and arable farming is practised on a large scale. The arable land includes both areas still farmed temporarily by the State (recognisable by the absence as yet of farmsteads), and parcels already leased out to farmers.

b – After about 30 kilometres the tall buildings (silo) of the State Farm for Southern Flevoland are seen to the left, rising out of the flat countryside. Soon afterwards a fairly massive inland dike is reached. This is the "Knardijk", which held back the water for more than ten years, when Eastern Flevoland had already been drained and Southern Flevoland was still submerged. To the left can be seen, adjoining the dike, the white superstructure of the lock in the Hoge Vaart. The road continues past the Knardijk into Eastern Flevoland.



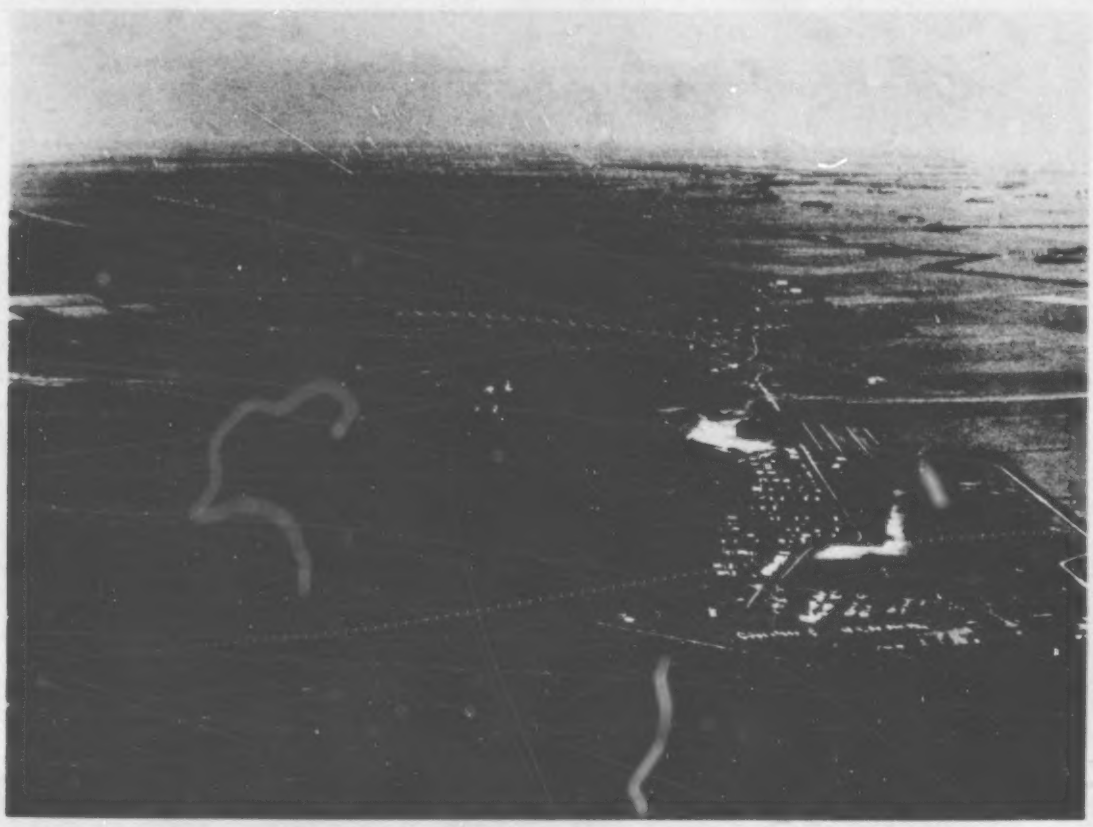
photograph XXII – *Market in the Meerpaal community centre in Dronten. In the background the circular theatre.*

The polder landscape at once gives a more finished impression. After a few kilometres turn right in the direction of Harderwijk and, after 4 kilometres where the road to Harderwijk leaves the polder, turn left past the Lovink pumping station, in a north-easterly direction. On the right is Lake Veluwe, one of the broadest sections of the peripheral lakes, with artificial beaches and other water sport and recreational facilities at the foot of the dike.

c – After some 10 kilometres the route turns left towards Biddinghuizen, one of the two "A" centres to be built in this polder in addition to Dronten and Lelystad. The present population of the village is about 2500. It was planned for an ultimate population of between 6 and 7,000. The plan and the housing are not particularly revolutionary.

d – From Biddinghuizen follow the signs to Dronten, which is situated about 8 kilometres farther north. Dronten is a "B" centre, planned as a regional centre for a large part of Eastern Flevoland and designed for a population of about 20,000.
The town is situated at a bend in the Lage Vaart (canal, along which are situated open spaces and industrial sites). A little farther to the east is the town centre, which has been kept free of through traffic. Around it are the residential areas. A strking feature of the centre are the "pile dwellings" bordering the central square, which somewhat conceal the shopping arcade, and the De Meerpaal community centre at one end of the square. The latter is a covered space where a market is held, sports matches are played etc., and also contains a theatre, restaurant, meeting rooms etc. (photograph XXII). The building is open to casual visitors.

e – From Dronten take the road towards Kampen, leaving Eastern Flevoland at the Roggebot lock in the peripheral lake. Cross the IJssel Bridge in the centre of Kampen and then turn left for Emmeloord.
This short diversion through the old land has two aims. The first is to give an impression of the past glory of the Hanseatic town of Kampen, which enjoyed a period of great prosperity in the Middle Ages when the IJssel was the principal Rhine arm.



photograph XXIII – *Lake Veluwe, looking N., with Eastern Flevoland, left, and the old land near Kampen, right. In the centre, near the bridge, the Roggebot lock (no. 3 on fig. 14). Right, camping-site and yacht harbour, behind which is the old land lying at about sealevel, with its farms generally built on mounds.*

The second is to show how, on the Kampen peninsula, the battle was fought against the water in earlier centuries. When Kampen declined as a trading town in the 15th century, the inhabitants found a new source of income in land reclamation on the Kampereiland. Since this low-lying area suffered much from flooding, each of the scattered farms was built on its individual "terp" (mound). Many of these farmsteads on their mounds can be seen on both sides of the road (photograph XXIII).

f – Crossing the Ramspol bridge brings us back to the Zuyder Zee polders, but now it is the more mature landscape of the North East Polder with its well-grown vegetation. The road passes Ens, one of the three villages of the North East polder with a population of over 1,000, and continues to Emmeloord. From here the description of Route B corresponds exactly with that of Route A, beginning at point 9 (see p. 49 et seq.).

Main Route C

Map: Motoring Map – Midden-Nederland and, if desired, Noord-Nederland, scale 1 : 200,000, published by A.N.W.B.

This route forms a combination of parts of main route A described above, since the road along the dike from Enkhuizen to Lelystad makes it possible to link the first and last sections of route A, if the route via the Barrier Dam, Friesland and the North East Polder is found to be too long.

The first section is the same as that of route A (p. 48). Various alternatives are possible from Hoorn.

– drive direct from Hoorn to Enkhuizen and then follow the dike to Lelystad. From the dike there is a good view of the discharge sluices and shipping locks at either end, i.e. the Krabbersgat Locks at Enkhuizen and the much larger Houtrib Locks near Lelystad.

From Lelystad route A is resumed (from para. 11 in the description, p. 51).

– from Hoorn first continue following route A in order to gain an impression of the Wieringermeer polder and the Barrier Dam.

To turn back there are two possibilities:

- immediately before the beginning of the Barrier Dam take the turning for Den Oever, where you park and visit on foot the beginning of the dam with statue of Lely and the Stevin Locks;
- drive along the Barrier Dam to about the half-way point, c. 9 km. passing the Monument, where a flyover (Breezanddijk) provides the possibility of turning back.

On the way from the Barrier Dam to Enkhuizen there is the further possibility of taking the direction of Medemblik from the southern part of the Wieringermeer polder and driving along the Lake IJssel coast, passing the pilot polder at Andijk, to reach Enkhuizen (cf. Detailed Route 1 and fig. 35).

Detailed Routes

There now follow brief descriptions of three detailed routes which connect with either of the main routes A, B, and C. They are designed for those who have enough time to explore a particular region more thoroughly and may wish to visit exhibitions and museums. The route indications have been kept very brief, but this will present no problem if the recommended maps are used.

Route 1 – West-Friesland/Wieringermeer

Maps: *Motoring Map - Midden - Nederland, scale 1 : 200,000, published by A.N.W.B.*
Tourist Map - Noord - Holland, scale 1 : 100,000, published by A.N.W.B.
Topographical maps at 1 : 50,000 and 1 : 25,000 scales, see key to sheets on p. 71.

1 – Hoorn – small town with some 40,000 inhabitants, the old centre of which testifies impressively to a great past as a fishing port and trading town. Many beautiful old buildings, one of which houses the Westfries Museum (address: Roode Steen 1).
Flourished around 1600; later declined as a result of the silting up of the harbour, the rise of Amsterdam and, lastly, the damming of the Zuyder Zee. It has since acquired new functions.

fig. 35 – Detailed route 1.

photograph XXIV – *In the foreground Medemblik, looking N.W.; behind, the Wieringermeer Polder; right, the Lely pumping station.*

Hoorn became a market for the surrounding agricultural area, industry established itself there and the town has become important for tourism and water-sports. In connection with the latter, it is of interest that, even if a choice is made for maximum impoldering of the Markerwaard, the water areas between the Markerwaard and the North Holland coast will be larger than in the original Zuyder Zee plan (compare fig. 11, p. 9 with fig. 14, p. 11). Address of V.V.V. tourist information: Gouw 18, tel.: (0)2290 - 18193.

2 – Enkhuizen – small town with some 12,000 inhabitants. Comparable in many respects with Hoorn, both as regards its history and its features of interest.
Among the buildings of architectural and historic interest are the 16th century fortifications (ramparts and gates) and the warehouses of the *East India Company*, in which is accommodated the *Zuyder Zee Museum*. The handsome interior houses an exciting survey of life and work on and around the old Zuyder Zee. Address: Wierdijk 18, tel.: (0)2280 - 3241, open from 10.00 to 17.00 hours (Sundays from 12.00 to 17.00 hours). Admission Hfl. 2,50; children Hfl. 1,–. Address of V.V.V. tourist information: Meidenmarkt 2, tel.: (0)2280 - 3844.

3 – If one drives north from Enkhuizen in the direction of Andijk and Medemblik, one passes, between the villages of Andijk-Oost and Andijk-West, the site of the 1927 pilot polder lying outside the dike. Stone steps leading to the top of the dike give one the opportunity of obtaining a view of this very first piece of land reclamation in the Zuyder Zee.

4 – Medemblik – with its ca. 6,000 inhabitants, is smaller than Hoorn and Enkhuizen. The little town has always been overshadowed by its two neighbours. Near the waterfront is the handsome restored 13th century citadel of Radboud. The draining of the Wieringermeer Polder brought new life. Because villages were built only in the centre of the new polder (see Chap. V), Medemblik functions as a centre for the south-east part of the polder (photograph XXIV).

5 – Middenmeer – one of the three original villages in the centre of the Wieringermeer; ca. 3000 inhabitants. This village was the first to develop as a centre for the surrounding agricultural area (weekly market and agricultural exchange), because reclamation took place from the west. The centre is situated along a widened stretch of the main road passing through the village. Two of the three churches of the village have been sited on the edge of the green so formed (cf. p. 27).

6 – Wieringerwerf (photograph X, p. 28) – This village, built later than Middenmeer, was designated as the administrative centre of the polder. In the municipal offices is housed a permanent exhibition of land reclamation in the Zuyder Zee, with the emphasis on the Wieringermeer (open on weekdays). The village is laid out on the same principle as Middenmeer. Here there are even four churches distributed about the village.
The remainder of this route corresponds with Route A, commencing at point 4 (p. 49).

Route 2 – North East Polder

Maps: *Motoring Map - Midden - Nederland, scale 1 : 200,000, published by A.N.W.B.*
Tourist Map - Friesland, scale 1 : 100,000, published by A.N.W.B.
Topographical maps at 1 : 50,000 and 1 : 25,000 scales, see key to sheets on p. 71.

1 – Marknesse – with 2100 inhabitants, the largest of the ten villages situated around Emmeloord . It is bounded on the north and west by the main road and by the polder canal on the south and east, and is protected by a green belt on the west side. In spite of the fact that a solution had again to be found here for the problem of siting four churches, the use of a great deal of planting, in particular, has created a village scene that is certainly not unattractive.

2 – Kraggenburg – on the way to this village we pass one of the two large areas of woodland in the North East Polder, in which are situated, in addition to various recreational facilities (including camp sites and swimming pools), the "De Voorst" Hydromechanical Laboratory and the National Aeronautical and Space Laboratory. In the former research is done in the open air with scale models in connection with hydraulic engineering works at home and abroad.

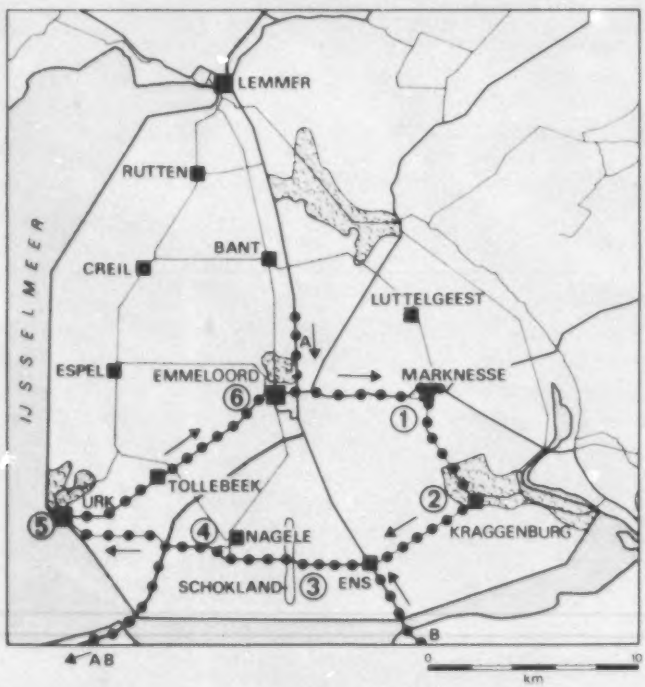
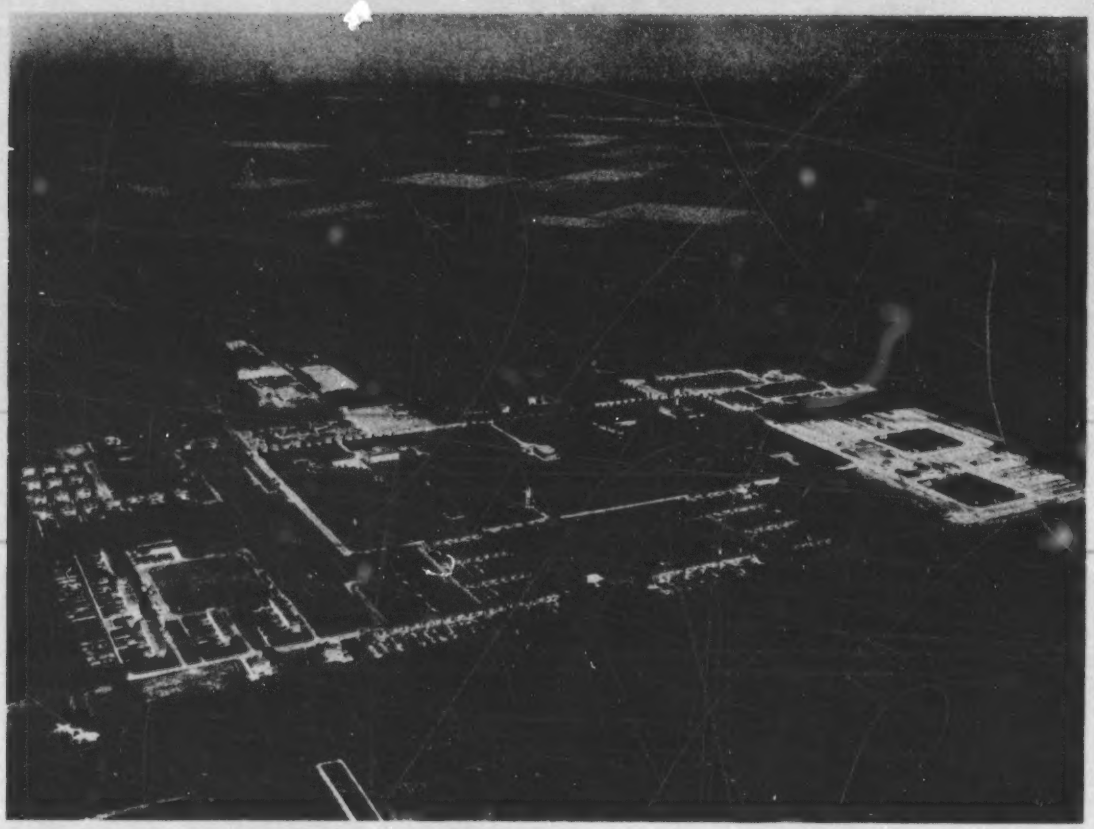


fig. 36 – Detailed route 2.

woods
water



photograph XXV – *Nagele, looking W.N.W. One of the ten villages built around Emmeloord. In the centre, the "Centrale Erf", with the public buildings. Around it, the residential closes grouped around smaller green areas (all since completed). Towards top right, farms along the road to Tollebeek.*

Kraggenburg itself, with its some 700 inhabitants, is one of the smaller villages. South of the village are many fruit farms.

3 – Passing **Ens,** with over 1600 inhabitants, the second largest village, the route continues towards Nagele. Between the two villages the elongated outline of the former island of Schokland rises up on either side of the road. The whole coastline of the island is marked by tall trees. A visit to the Middelbuurt Museum situated on this island is highly recommended, not only because of its contents (geological and zoological history of the Zuyder Zee region, history of Schokland), but also because of its unique situation and surroundings. The former church and manse of the Middelbuurt, which house the museum, are situated on a somewhat higher part of the island, surrounded by a sea wall that is partly of timber and from the foot of which arable fields now extend (photograph XXIX, p. 64); address: Schokkeringweg, Ens, tel.: (0)5275 - 1396, admission Hfl. 0,50.

4 – Nagele – is the third village in the North East Polder with more than 1,000 inhabitants. As far as the lay-out is concerned, the principle of the Wieringermeer villages is repeated in nearly all the villages of this polder: a green or widening of the main street as centre, onto which residential streets open on both sides. Nagele is an exception, however. A group of architects devised a quite different plan here. The houses are built around closes, which are grouped in turn around a large rectangular field (cf. a campus), on which are situated the public buildings. It is also noteworthy that all the buildings in this village have a flat roof (photograph XXV).

5 – Urk – Fishing village on a former island, with over 10,000 inhabitants (see photographs XXVI and XXVII). Separate municipality. For this reason its population is not included in statistics relating to the North East Polder. As was described earlier, the importance of Urk as a fishing port has constantly increased despite the damming of the Zuyder Zee. The return home of the fishing fleet each Friday afternoon is a fine sight.

photograph XXVI – *The island of Urk in the Zuyder Zee. In the foreground, the fishing harbour.*

photograph XXVII – *The island of Urk in the North East Polder. Left, the Urk wood, in course of planting, in which is situated the P. van der Lijn boulder clay reserve.*

Urk is a remarkable village with its narrow streets and little old houses, with the older inhabitants, in particular, still wearing the traditional costumes.
Two tips concerning a visit to the village: on account of the narrow streets, park the coach on the edge of the village and continue on foot. Respect the Sabbath rest, to which the Orthodox Protestant population attaches great value.
North of the village on the new land is the Urk wood, containing the P. van der Lijn geological reserve. This is a boulder clay reserve with a great wealth of stones.

6 – Passing **Tollebeek**, with ca. 560 inhabitants, the smallest village in the polder, return to Emmeloord, where main route A (point 9) or B may be rejoined as desired (p. 50).

Route 3 – Eastern Flevoland

Maps: *Motoring Map - Midden - Nederland, scale 1 : 200,000, published by A.N.W.B.*
Tourist Maps Veluwe and Utrecht, scale 1 : 100,000, published by A.N.W.B.
Topographical maps at 1 : 50,000 and 1 : 25,000 scales, see key to sheets on p. 71.

1 – From Lelystad drive westwards out of the city by the Houtribdreef (see fig. 33, p. 50). Turn right at the T-junction (Houtribweg) and after 500 m. left (towards Enkhuizen). Start following immediately the signs for "Informatiecentrum/Nieuw Land".

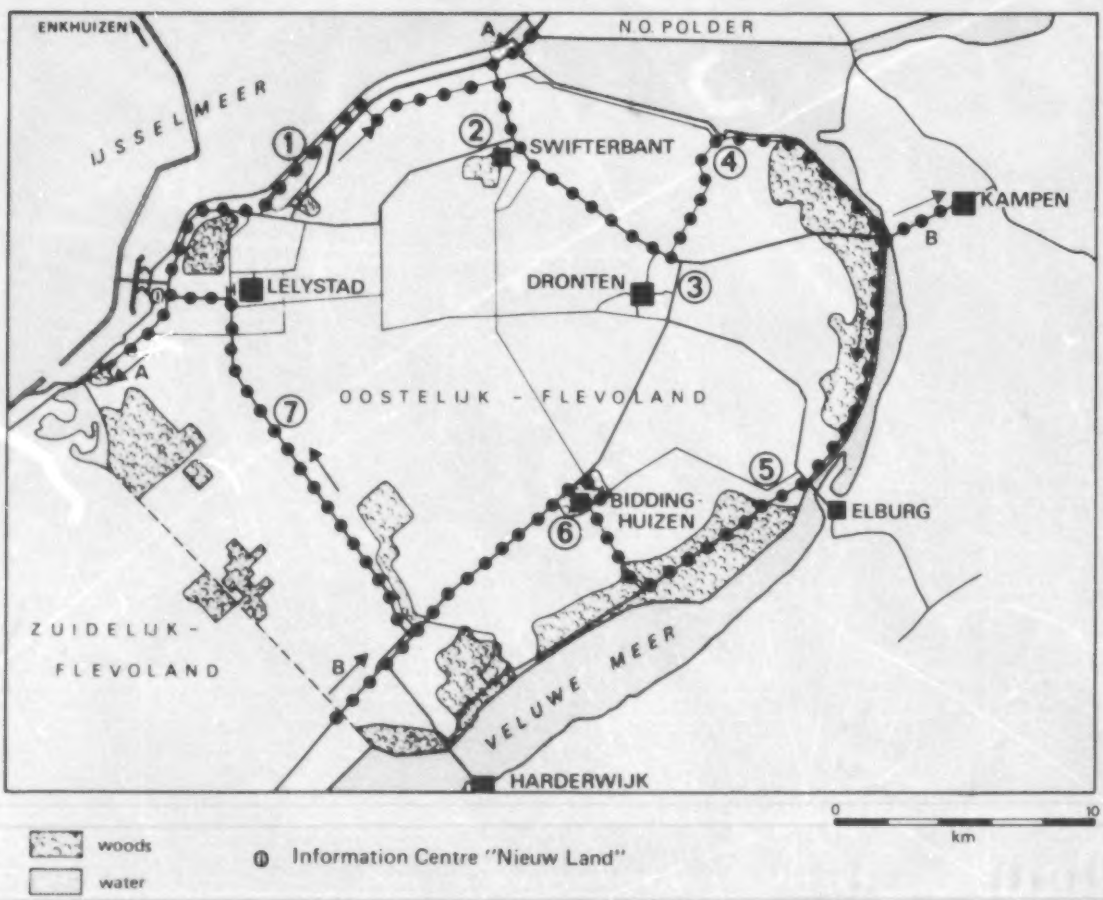


fig. 37 – Detailed route 3.

photograph XXVIII – *The village of Swifterbant in Eastern Flevoland, situated on the road from the Ketel Bridge to Dronten, which crosses the photograph from left to right centre. Quite different in structure from the villages in the two older polders. The large green area known as "De Greente" occupies a central position among the rows of houses. The shop and main service provisions are located along the street leading from De Greente to the main road.*

This information centre contains a detailed exhibition about the Zuyder Zee works, as well as giving film shows (including films with commentaries in English, German and French – by arrangement only). Address: Houtribhoogte, Lelystad, tel.: (0)3200 - 27799, open from 10.00 to 17.00 hours, admision 1 guilder. (From 1st November to 1st April: closed Saturdays, open Sundays from 13.00 to 17.00 hours).
The route then continues northwards (in the direction of Emmeloord) along the Houtribweg. After the road has curved towards the east, after about 2 1/2 km. take the *first* road left.
This road leads first past the fish farm, then past the Flevo power station and then crosses the main road. About five kilometres farther on turn right along the major road to Swifterbant.

2 – Swifterbant – one of the two "A" centres in the Eastern Flevoland polder. It now has ca. 3600 inhabitants. A striking feature is the central green space, De Greente, surrounded by blocks of dwelling and opening onto the centre with its church, shops etc. (photograph XXVIII).

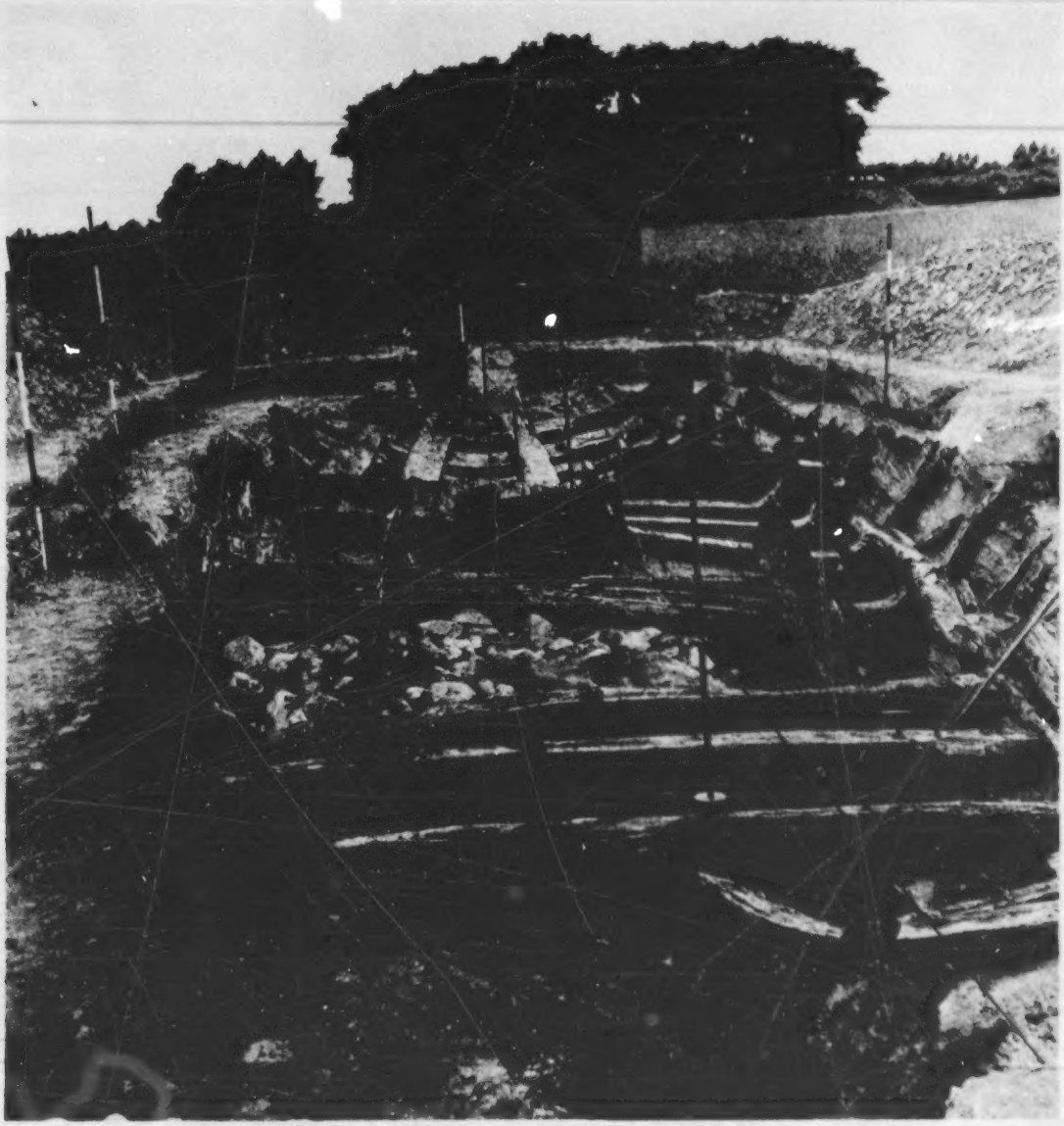
3 – Dronten – see the description under main route B, p. 55.

4 – Ketelhaven – near the Colijn pumping station here there is a yacht harbour and, adjoining it, the Museum of Marine Archaeology. Here are to be seen the remains of ships and their cargoes from many centuries, found in the Lake IJssel polders after the water had drained away (see also Appendix 1, p. 65). Open from 10.00 to 17.00 hours, admission charge 50 cents.

5 – Follow the dike southwards along the peripheral lakes. On the landward side, the woods with camp-sites, etc., on the lake side, the artificial beaches and islands. A few kilometres before the turning off to Elburg one reaches, on the right hand side of the road, the Flevohof, a permanent exhibition devoted to agriculture and horticulture in the whole of the Netherlands. On the 140 hectare site, in addition to exhibition buildings, there are arable and livestock farms and market gardens in full operation. Open from 08.30 to 18.00 hours, admission charge 4 guilders per person with reduction for parties of more than 20 persons.

6 – Biddinghuizen – see description under main route B, point c. (p. 55).

7 – The route back to Lelystad leads first past the Larserbos (right) and then past a small airfield (left, used mainly for crop spraying and by flying clubs).
From Lelystad the main route A/B can be followed again (p. 51).



photograph XXIX – *Wreck of a ship in the North East Polder, discovered near the Middelbuurt on the former island of Schokland. In the background, behind the timber facing, the former church, which now houses the Middelbuurt Museum.*

C – APPENDICES

1. Archaeological and other finds

Each time after a polder fell dry, reconnaissance resulted in the finding of a number of interesting objects on and in the soil.
In broad outline, three categories may be distinguished:

a – Archaeological finds from the times when certain parts of the later Zuyder Zee were land. Particularly in the south of the North East Polder and in the north of Eastern Flevoland there have been many important finds of remains of prehistoric habitation on former river dunes and marine clay levées.
About 3,600 to 3,000 years ago there lived here the representatives of the "Swifterbant Culture" (named after the nearby settlement, because they do not fit into one of the already known cultures). Habitation remains have also been found from the period around 1700 B.C. (the Veluwe Bell Beaker Culture).
This area was later increasingly covered by floods, so that the last settlements disappeared during the 12th and 13th centuries.

b – During the centuries, from about the year 1000, the Zuyder Zee was busy with fishing boats and merchant ships, many of which were swallowed by the storm-tossed waters of the former inland sea. Their remains now afford a good opportunity of studying the history of ship-building (see photograph XXIX), while the various utensils and items of cargo that have been found give an impression of the lives and work of the inhabitants of the Zuyder Zee region in former centuries.

c – During the Second World War many aircraft were shot down over Lake IJssel and their twisted remains came to light after the draining of the polders. The propellor of one of them has been used for a war memorial on the central square of Dronten.

In Eastern Flevoland alone prehistoric habitation remains have been found at eleven places, as well as the wrecks of 112 ships and 23 aircraft.

Apart from this, investigation of the soil in the newly drained polders provides a good opportunity for studying the geology, flora and fauna over a period of hundreds of thousands of years. Many glacial erratics and vertebrae of prehistoric animals have been discovered, for example.

Much of what has been described above may be seen in various museums and exhibition rooms in the Lake IJssel region (see descriptions of the excursion routes).

2. Statistics.

1 - 1 - 1979	Wieringermeer	N.E. Polder	E. Flevoland	S. Flevoland	Netherlands
The land:					
total area, km2	210	472**	554	499	37 307
land area, km2 *	195	465**	523	420	33 810
% sandy soils	31	16	4	2	46
land use, % :					
farmland	87	87	75	50	23
woodland and areas of nature conservation	3	5	11	25	13
residential areas	1	1	8	18	20
dikes, roads, watercourses	9	7	6	7	
average size of agricultural holdings (1971, ha)	36,0	25,6	39,1	–	11,9
Population:					
number and density					
no. of inhabitants 1-1-1979	12 285	46 747 **	54 493	4 224	13 985 526
density per km.2 land	63	99	104	16	413
age structure					
% 0 - 19 years	37,6	37,6	40,2	31,6	32,0
% 20 - 64 years	53,3	55,3	56,9	64,4	56,7
% 65 + years	9,2	7,1	3,0	4,0	11,3
natural increase in 1979:					
birthrate (per 1000)	12,5	16,9	19,8	24,7	12,4
deathrate, id.	5,2	4,7	2,5	3,8	8,0
excess of births, id.	7,3	12,2	17,3	20,9	4,4
migration in 1979:					
immigrants, per 1000	31,4	50,8	108,2	465,2	7,5
emigrants, id.	42,7	45,2	49,6	31,6	4,3
net migration, id.	– 11,3	+ 5,7	+ 58,6	+ 433,6	+ 3,2
growth in 1979:					
total population growth, per 1000	– 4,0	+ 17,9	+ 75,9	+ 454,4	+ 7,6
no. of inhabitants 1-1-1980	12 235	47 590**	58 793	6708	14 091 014

* excluding waters within the dikes wider than 6 metres, such as navigation and drainage canals.

** excluding the 6.5 km2 land area and 10,187 inhabitants of the municipality of Urk.

Sources: Central Bureau for Statistics (CBS) and statistical summaries of the Southern IJsselmeer Polders Board and of the municipalities of Wieringermeer, North East Polder and Dronten.

Populations of settlements and rural areas, 1-1-1980

Wieringermeer:	
Wieringerwerf	4 476
Kreileroord	818
Middenmeer	3 015
Slootdorp	1 262
rural area of Wieringermeer	2 661
total Wieringermeer	**12 232**
North East Polder *	
Emmeloord	18 030
Bant	682
Creil	758
Ens	1 611
Espel	706
Kraggenburg	717
Luttelgeest	692
Marknesse	2 137
Nagele	1 102
Rutten	638
Tollebeek	565
rural area of North East Polder	9 735
total North East Polder	**37 403**
Eastern Flevoland	
Lelystad	38 304
Dronten	9 356
Biddinghuizen	3 443
Swifterbant	3 600
rural area of Eastern Flevoland	4 090
total Eastern Flevoland	**58 793**
Southern Flevoland	
Almere	6 569
rural area of Southern Flevoland	139
total Southern Flevoland	**6 708**

* excluding Urk (10,187 inhabitants).

3. Explanation of topographical names

A completely separate and almost unique aspect of opening up a newly reclaimed area is the allocation of a large number of topographical names. The list below shows that those responsible in the Zuyder Zee region were guided partly by the history of the area and, for the rest, aimed at perpetuating in the topographical nomenclature the names of those who had an important share in the preparation and execution of the project.

	named after:
Wieringermeer	– the island of Wieringen at the western end of the barrier dam.
Wieringerwerf	– see Wieringermeer; situated near the "werf" (mound).
Slootdorp	– former channel - "De Sloot" (ditch); dorp = village.
Middenmeer	– situated in the *middle* of the Wieringer*meer* (lake).
Leemans pumping station	– hydraulic engineer (1841 - 1929).
Lely pumping station	– originator of the Zuyder Zee project.
Afsluitdijk	– (barrier dam) dike for closing off *(afsluiten)* the Zuyder Zee.
Stevin locks	– devised the first Zuyder Zee plan (1614 - 1670).
Lorentz locks	– physicist; chairman of the Zuyder Zee Commission (1853 - 1928).
North East Polder	– situated in the north-east of Lake IJssel.
Emmeloord	– former settlement on Schokland.
Marknesse	– former settlement in the south-west of the polder.
Kraggenburg	– Kragge = floating island; burg = fortified place.
Ense	– former village on Schokland.
Nagele	– channel and village which lay between Urk and Schokland until 1300.
Tollebeek	– former settlement in the neighbourhood of Urk.
Espel	– former settlement north of Urk.
Creil	– former settlement.
Rutten	– former settlement north of Urk.
Bant	– former settlement in Friesland, the lands of which extended southwards into the area of the present polder.
Luttelgeest	– former settlement (geest = sand).
Buma pumping station	– one of the founders of the Zuyder Zee Association.
Smeenge pumping station	– member of parliament, who contributed greatly to the realisation of the Zuyder Zee plan.
Eastern Flevoland	– eastern part of the polder, named after Lake Flevo from the Roman period.
Lelystad	– see Lely pumping station; stad = town.
Dronten	– lost township near Kampen.
Biddinghuizen	– former settlement (mentioned in charter book from the year 793).
Swifterbant	– idem.
Wortman pumping station	– Director-General of the Zuyder Zee works (1858 - 1939).
Colijn pumping station	– statesman; chairman of the Zuyder Zee Council (1869 - 1944).
Lovink pumping station	– agricultural expert (1866 - 1938); chairman of the State Commission which studied agricultural aspects of the impoldering scheme.
Southern Flevoland	– see Eastern Flevoland.
Almere	– the enlarged Lake Flevo was called Almere (= large lake) during the Middle Ages.
Zeewolde	– wolde = wood. Also an old name.
de Blocq van Kuffeler pumping station	– hydraulic engineer (1879 - 1946); Director of the Zuyder Zee works.
Oostvaardersdiep	– follows the route formerly taken by the Amsterdam mariners sailing to the East Indies.
Markerwaard	– island of Marken (in the west of the future polder); waard = low-lying area of land surrounded by water.

(Sources: lists of geographical names in the Wieringermeer, the North East Polder and Eastern Flevoland, published by the Ministry of Traffic and Water Affairs).

4. Travel and Accommodation

The Lake IJssel region can be reached in a number of ways. Centres situated around Lake IJssel such as Enkhuizen, Hoorn, Amsterdam, Naarden-Bussum, Harderwijk, Kampen and Stavoren are served by frequent train services (at least once an hour). The polders themselves are accessible, as far as public transport is concerned, by bus services which usually start from the railway stations in the surrounding centres (the railway from Amsterdam is expected to be open to Almere in 1987 and to Lelystad in 1988).

The following is a summary of the most important of these bus services:

Alkmaar – Den Oever – Harlingen – Leeuwarden
Alkmaar – Den Oever – Sneek – Heerenveen
Amsterdam (Amstel Station) – Lelystad
Harderwijk – Lelystad
Kampen/Elburg – Dronten – Lelystad
Lelystad – Emmeloord
Kampen – Emmeloord
Emmeloord – Urk
Steenwijk – Emmeloord
Lemmer – Emmeloord
Enkhuizen – Lelystad
Bussum – Lelystad
Express Service Amsterdam – Lelystad – Emmeloord

For private transport we refer to the motoring map (1 : 200,000) and tourist maps (1 : 100,000) of the Royal Netherlands Touring Association, A.N.W.B. (see Appendix 6, p. 70). In this connection it should be mentioned that, in Eastern Flevoland, a completely signposted route has been marked out by the A.N.W.B. This is the 'Zeebodem route' (Seabed Route), which passes many interesting places (descriptive leaflet obtainable from the A.N.W.B.).

There also exist a few ferry connections, such as Enkhuizen – Stavoren and Enkhuizen – Urk, about which it has already been remarked that they have largely lost their *raison d'être* because of the completion of the new road links over the Barrier Dam and across the polders. They consequently still operate only for the benefit of tourists during the period from May to September. None of these ferry boats carry cars (information from Netherlands Railways at the station of Enkhuizen, tel.: (0)2280 - 2855).

It is also possible to make a tourist boat trip from Amsterdam to Marken and Volendam twice daily during the summer months, and a round trip on the Markermeer (Lake Marken) lasting one hour from the "Nieuw Land" exhibition near Lelystad (departures on the hour from 1st April to 30th September). Tourist boat trips can also be made on the marginal lakes of the Flevo polders, e.g. from Harderwijk.

As far as accommodation is concerned, there are hotels and/or guest houses in nearly all the centres situated around Lake IJssel, as well as in Almere, Dronten, Emmeloord and Lelystad. There are also a large number of camp-sites (a few in the polders, the majority on the surrounding old land) and ten youth hostels:

in Sneek and Heeg in the province of Friesland;
in Meppel in the province of Drente;
in Oldebroek and Putten in the province of Gelderland;
in Amersfoort and Soest in the province of Utrecht;
in Kortenhoef and Amsterdam in the province of North Holland;
in Lelystad-Haven in Eastern Flevoland.

Further information from Netherlands Youth Hostels Association, Prof. Tulpstraat 4 - 6, Amsterdam (tel.: (0) 20-264433).

5. Sources consulted and recommended reading

- Constandse, A.K. and Schonk M.K.A. – Leven in Lelystad; een onderzoek naar de kwaliteit van het bestaan in een nieuwe stad. (Life in Lelystad; an investigation into the quality of life in a new town) Ministry of Transport and Public Works/IJsselmeer Polders Development Authority, Lelystad, 1980; 208 pp.
- Dronten, nieuwe gemeente in nieuw land (Dronten, new municipality in new land). IJsselmeer Polders Development Authority; pub. Staatsuitgeverij (State Publishing House), The Hague, 1972; 191 pp.
- Heide, G.D. van der – Van landijs tot polderland; tweeduizend eeuwen Zuiderzeegebied (From land ice to polderland; 2,000 years of the Zuyder Zee region). Pub. Strengholt, Amsterdam, 1965; 675 pp.
- De ontwikkeling van het Markerwaardgebied (The development of the area of the Markerwaard); Report submitted to the Second Chamber of the States General, Part a: Policy Proposal. Ministry of Transport and Public Works/Ministry of Housing and Physical Planning; pub. Staatsuitgeverij, The Hague, 1980, ISBN 90 12 03198 2; 44 pp.
- Markerwaard: nieuwe ruimte; (Markerwaard - new space); summary of the report on the Development of the region of the Markerwaard. Ministry of Transport and Public Works, The Hague, 1980; 30 pp.
- Polman, G.K.R. – The Oostvaardersplassen, a water fowl reserve in the lately reclaimed Flevoland Polder. in: Land & Water International 44 (1981), The Hague, p. 19-24.
- Rijksdienst voor de IJsselmeerpolders (IJsselmeer Polders Development Authority) – Leaflets:
  - Boeiend verleden (Thrilling past)
  - IJsselmeerpolders in beeld (Pictorial Lake IJssel Polders)
  - Boeren op nieuw land (Farmers on new land)
  - Lelystad, nieuwe stad (Lelystad, new city)
  - Dier en plant in polderland (Animal and plant in polderland)
  - Recreatie in Flevoland (Recreation in Flevoland)
  - Almere, open stad (Almere, open city)

Other publications:

- Constandse, A.K. – Planning and creation of an environment (a reappraisal); experiences in the IJsselmeer polders
- Flevoland, facts and figures (annually)
- Room at last! The IJsselmeer Polders described and illustrated
- Het Zuiderzeeproject: drie eeuwen inspiratie voor plannenmakers
  (The Zuyder Zee project: three centuries of inspiration for planners).

6 – Maps

Topograpical Maps

The Topografische Dienst (address: Westvest 9, 2611 AX Delft) publishes maps of the whole of the Lake IJssel region at the scales of 1 : 10,000 (grey outline only), 1 : 25,000 and 1 : 50,000 (in grey outline and colour). For sheet numbers see sheet index on p. 72. Prices: 1 : 10,000 grey outline: Hfl. 13,–; 1 : 25,000 and 1 : 50,000, grey outline: Hfl. 5,–, colour: Hfl. 8,80.

Thematic Maps

- Motoring map Midden - Nederland (1 : 200,000), for the Flevo polders and the southern part of the North East Polder
- Motoring map Noord - Nederland (1 : 200,000), for the Barrier Dam, Wieringermeer and northern part of the North East Polder.

- Tourist Map (1 : 100,000):

  1. Noord - Holland, for the Barrier Dam and the Wieringermeer
  2. Friesland, for the North East Polder
  6. Utrecht, for Southern Flevoland and the western part of Eastern Flevoland
  7. Veluwe, for the eastern part of Eastern Flevoland.

The motoring and tourist maps described above are all published by the Royal Netherlands Tourist Association, A.N.W.B., Wassenaarseweg 220, 2596 EC The Hague.

- Water control maps (1 : 50,000), Rijkswaterstaat, P.B. 20906, 2500 EX The Hague.
- Geological maps (1 : 50,000) Rijksgeologische Dienst, Spaarne 17, 2011 CD Haarlem.
- Soil maps (1 : 200,000 and 1 : 50,000), Stichting voor Bodemkartering P.B. 98, 6700 AB Wageningen.
- Land Use of Flevoland (1 : 50,000), IJsselmeer Polders Development Authority, Zuiderwagenplein 2, 8224 AD Lelystad.

Town Plans

- Almere (1 : 10,000), pub. by CITOplan, Groot Hertoginnelaan 156, 2517 EM The Hague.
- Emmeloord and surrounding villages, pub. by Hoekstra b.v., Werktuigenweg 13, Emmeloord
- Lelystad (1 : 12,500), pub. by CITOplan, The Hague.

7 – Addresses

- Almere; Openbaar Lichaam Zuidelijke IJsselmeerpolders (South IJsselmeer Polders Board), Information Dept., Raadhuis, Kerkstraat 98, 1354 AA Almere, (0)3240 - 10194
- Municipality of Dronten, Information Dept., Gemeentehuis, Ottoplein 2, 8251 GG Dronten, (0)3210 - 2444
- Municipality of Lelystad, Information Centre, "Het Roer" Building, Noordwagenplein 6, 8223 AL Lelystad, (0)3200 - 33033.
- Municipality of North East Polder, Public Relations Dept. Gemeentehuis, Boterbloemstraat 2, 8302 CA Emmeloord, (0)5270 - 5161.
- Municipality of Wieringermeer, Information Dept., Raadhuis, Loggersplein 1, 1771 CE Wieringerwerf, (0)2272 - 2344
- Schokland Museum, Middelbuurt, Post Emmeloord, North East Polder, (0)5275 - 1396
- Rijksdienst voor de IJsselmeerpolders (IJsselmeer Polders Development Authority), Information Dept., Zuiderwagenplein 2, 8224 AD Lelystad, (0)3200 - 99111.
- Museum of Marine Archaeology, Vossemeerdijk 21, 8251 PM Ketelhaven, Eastern Flevoland, (0)3210 - 3287
- Zuyder Zee Museum, Wierdijk 18, 1601 LA Enkhuizen, (0)2280 - 3844.

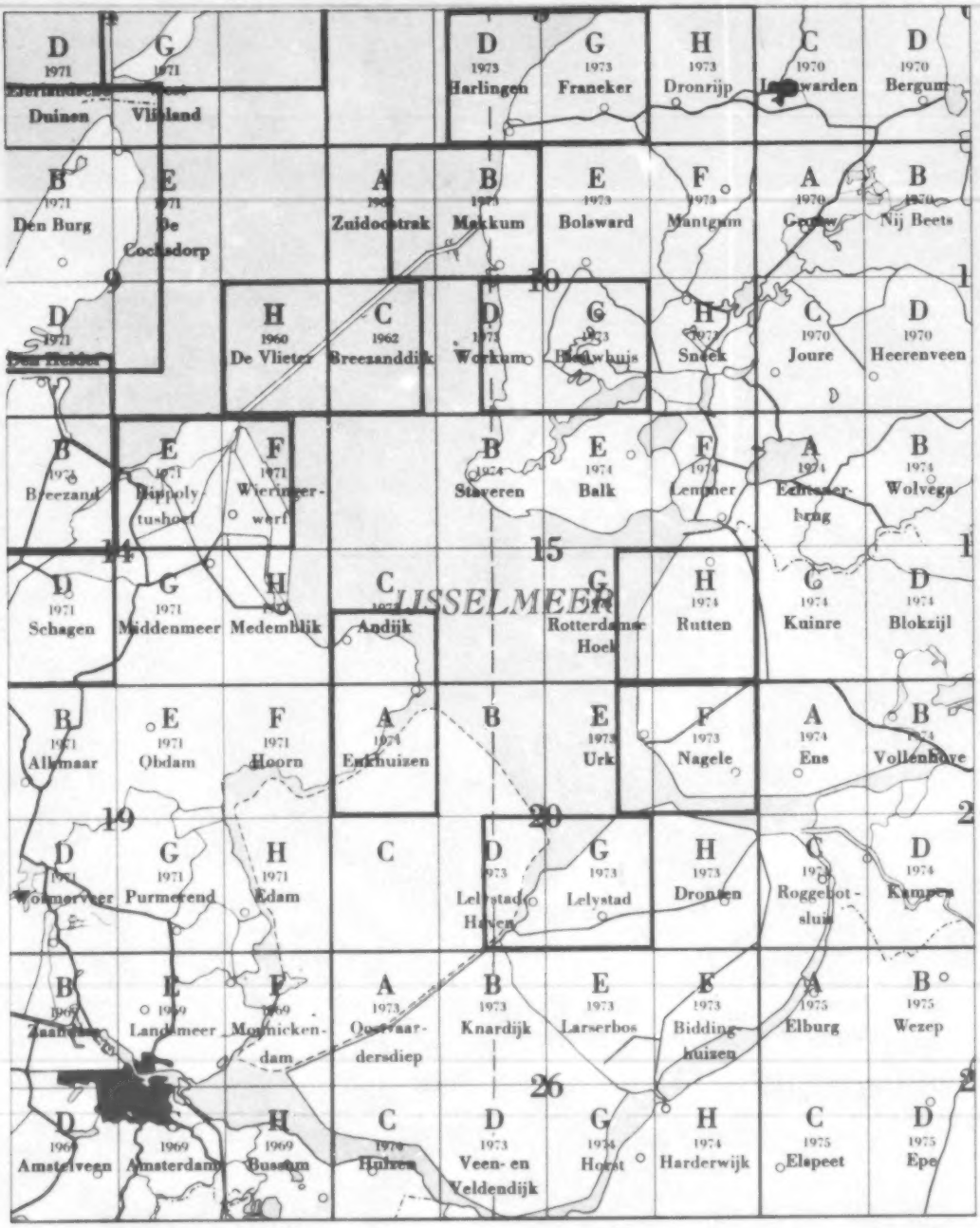


fig. 40 – Sheet index topographical maps.

Each lettered block represents one sheet of the 1 : 25,000 scale map.
Blocks ABCD and EFGH are always available as 1 : 50,000 scale maps, designated as (no.)-West and (no.)-Oost, respectively There are also 1 : 10,000 scale maps which always cover half of a 1 : 25,000 map sheet (North or South).

For example – Dronten occurs on the following maps:

1 : 50,000 – 20 - Oost (East)
1 : 25,000 – 20 - H
1 : 10,000 – 20 - H Zuid (South)

The rectangles in heavy outline refer to a new division of the 1 : 25,000 map series, which is being introduced in stages.